

Faculty of Arts
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INTRODUCTORY NOTES TO A SPECULATIVE EPISTEMOLOGY OF ARCHAEOLOGY

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DOCTORAL DISSERTATION

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Introductory Notes to a Speculative Epistemology of Archaeology
Marko Mikael Marila

University of Helsinki
Faculty of Arts
Doctoral Programme in History and Cultural Heritage

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Cover image: Somatic practice as a speculative method in archaeology. Artist and archaeologist Suvi Tuominen at the remains of the WW2 PoW camp site of Kankiniemi in Inari, Finland. Photographed by author.

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ABSTRACT

In philosophical metaphysics, speculation is often seen to have value as an ontological concept referring to rational contemplation on the fundamental yet unobservable nature of reality. In philosophy of science, on the other hand, speculation is commonly taken as an epistemological notion to mean that a proposition regarding the nature of reality can be possibly either true or false, and that the veracity of that proposition can be tested against empirically observed facts. This simplistic division into speculation as a matter of metaphysics and a matter of empirics also pertains to archaeology where (archaeology being a characteristically empiricist discipline) speculation has had little value as an ontological concept pertaining to the unobservable. Instead, speculation—as well as the ambiguity and uncertainty introduced with it—have been treated as provisional resorts and as epistemological points of elimination.

Many epistemological strategies have been adopted in archaeology to eliminate speculation in favor of proof and certainty. These strategies range from the inductivism of traditional archaeology to the deductivism of the New Archaeology, and more recently to views of archaeological reasoning as inference to the best explanation. In reviewing the history of archaeology in terms of these common conceptualisations of the form and constituents of archaeological inference, and in drawing philosophical inspiration from a range of speculative philosophies as well as contemporary archaeological theorising, this thesis argues that the desirable strategy in the epistemology of archaeology is not the commonly adopted systematic elimination of speculation. In contrast, the thesis takes speculation seriously and contends that it has significance in the epistemology of archaeology as both an epistemological and an ontological notion. The thesis holds that in order to develop an empirically sensitive, ontologically considerate, and ethically sustainable epistemology of archaeology, speculation should be cultivated and cared for as a systematic consideration of the multiplicity of experience. In other words, speculation is to be preserved as a method of thinking otherwise; a countermeasure to the methodological (and the ensuing ontological) simplification risked by adhering to eliminationist strategies.

The practical possibilities towards a speculative epistemology of archaeology are discussed in terms of methodological and theoretical deceleration, a matter that has become increasingly relevant with the recent natural scientific revolution in archaeology. Slowing down, in this context, aims towards a historical understanding of the discipline—and science at large—as a community of practitioners with possibly conflicting concerns. In this way, the principle of speculative epistemology becomes the perpetual anticipation of the possible practical effects of pursuing truths and realities on epistemologies that entertain different notions of those concepts.

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We may sacrifice years to thankless study in order to hunt some golden unicorn glimpsed one day in the library, even though it may never enter our grasp and no one else may even believe that we ever saw it. (Harman 2005, 141)

The work of an individual is always collaborative and social. Countless people, conversations, places, institutions, lectures, travels, encounters, and happenstances have contributed towards the unfolding of this work. I am grateful for the kind support I have always received from the scientific community, in Finland and elsewhere.

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LIST OF RESEARCH ARTICLES

This thesis is based on four previously published peer-reviewed research articles and one article manuscript. Each article is referred to in the text by its number. The first version of Article 5 manuscript was written by Marila and the text was jointly edited over the course of a year. In the current version both authors claim equal ownership of the text.

Article 1

Marila, M. 2015. Pragmaticism—the new possibility of a scientific archaeology as seen in the light of the history of archaeology. In *Today I Am Not the One I Was Yesterday: Archaeology, Identity, and Change. Papers from the Fourth Theoretical Seminar of the Baltic Archaeologists (BASE), Archaeology and Identity, Held at the University of Helsinki, Finland, October 8th–10th, 2009, and the Fifth Theoretical Seminar, Archaeology Today: Things to Be Changed, Held at the University of Tartu, October 27th–29th, 2011*, edited by A. Haak, V. Lang, and M. Lavento. *Interarchaeologia* 4.

Article 2

Marila, M. 2014. Things in action—interpreting the meanings of things in archaeology. In *Sounds Like Theory. XII Nordic Theoretical Archaeology Group Meeting, 25–28 April 2012 Oulu*, edited by J. Ikäheimo, A.-K. Salmi, and T. Äikäs. The Archaeological Society of Finland.

Article 3

Marila, M. 2017. Vagueness and archaeological interpretation: a sensuous approach to archaeological knowledge formation through finds analysis. *Norwegian Archaeological Review* 50(1), 66–88.

Article 4

Marila, M. 2018. Finnish reactions to New Archaeology. *Fennoscandia archaeologica* 35, 19–47.

Article 5

Marila, M. and Sørensen, T.F. Between the facts: speculation in the history of archaeological thinking. Unpublished article manuscript.

FOREWORD

We must be systematic; but we must keep our systems open. In other words, we should be sensitive to their limitations. There is always a vague 'beyond', waiting for penetration in respect to its detail. (Whitehead 1956, 8)

Since the beginning of my studies in archaeology I have been fascinated with how attempts to provide a conclusion to an archaeological problem only tend to unleash further questions. This peculiarity has led me to develop an interest in the theoretical and philosophical aspects of archaeology. What interests me about archaeological theory in particular are archaeologists' attempts to conceptualise the intellectual process by which we expand our knowledge from the observation of archaeological facts to accounts of the unobserved lived past realities. At times this step from 'mere observation' of the archaeological record to the 'explanation' or 'understanding' of what happened in the past can appear as a speculative leap of faith. The speculative nature of this leap has been a cause for epistemological anxiety in archaeology for as long as the discipline has existed. In this sense, I have also developed a specific interest in the study of the history of archaeology from the viewpoint of the speculative leap of faith, and I find myself fascinated by how archaeologists have dealt with the anxieties introduced with speculation.

This thesis, then, is a product of my interest in the history of archaeological speculation. In the historiographic sense, the thesis is a comparison of the many conceptualisations of the nature and limits of archaeological knowledge, the process and logical form of knowledge formation, and the role of speculation in it. Some refer to this area of research vaguely as archaeological theory, while sometimes the terms 'metamethodology' or 'metaarchaeology' are used in referring to archaeologists' critical self-reflection on those philosophical and practical aspects that are relevant for archaeological knowledge production (Embree 1992; Klejn 2001). For this purpose, I, however, have chosen to use the term 'epistemology of archaeology' throughout the thesis. Partly, then, this thesis is an exercise in the history of the epistemology of archaeology. In order to fulfil its objective to become a comparative study in the epistemology of archaeology, the thesis provides both a historical and a philosophical take on the changing epistemologies of archaeology from the empiricism of 19th century culture historical archaeology to the positivism of New Archaeology, and to the semiotic approaches of the late 20th century interpretive archaeology.

The material used for this study consists of the archaeologists' own published reflections on their discipline. In this sense, following the distinction between archaeology proper and metaarchaeology, one should distinguish between archaeological research and archaeologists' epistemological reflection on their research. Especially in Finnish archaeology,

epistemological reflection is rarely incorporated in research reports or publications and, as result, the epistemological positions of individual researchers has had to be deciphered from a narrow body of theoretical texts—that is, from what archaeologists say they do rather than from what they have done. This is also to say that the ‘real’ history of archaeological speculation (how specific archaeological ideas are born and become verified or falsified) would be a huge undertaking and therefore falls outside the scope of this thesis.

In addition to its emphasis on matters of the history of archaeology, the thesis, more importantly, sets out to formulate a speculative epistemology for an archaeology to come. In this contemporary and anticipatory sense, the views presented in the thesis can be seen to connect with so-called neo-empiricist archaeological theory and the ensuing speculative attitude. While the history of the epistemology of archaeology is to a large extent a history of separation between ontology and epistemology, in recent archaeological theory epistemological questions have come to be replaced with ontological concerns and the idea that metaphysical speculation can be empirically relevant. To some extent, this ‘ontologisation’ of archaeological theory has taken place with the expense of epistemology. Therefore, in using the ontological discussions in recent archaeological theory as its main impetus, the thesis aims to both explore the epistemological relevance of speculation in archaeology and to formulate a speculative epistemology of archaeology that is faithful to the history of the epistemology of archaeology, hence the term ‘speculative epistemology’ in the title of the thesis. In terms of philosophical inspiration, the type of speculative epistemology of archaeology argued for in this thesis draws mainly from two intellectual traditions, continental metaphysics and classic pragmatism. Recent continental metaphysics provides a philosophical background for much of the ontological considerations presented in the thesis, while the epistemological extent of the thesis draws heavily from classic pragmatism. As a historical and philosophical synthesis, the aim of the thesis is to present an ontologically responsible and empirically sensitive account of the epistemology of archaeology for the 21st century.

The epistemology of archaeology, and philosophy of archaeology in general, occupy a peculiar space in the topology of the humanities (e.g. Wylie 2013, 107). On the one hand, the epistemology of archaeology draws very liberally from a host of different philosophical traditions. At times, this freedom in choosing approaches or philosophies as food for theoretical inspiration can make the epistemology of archaeology appear internally conflicted to scholars viewing it from within discrete philosophical schools or systems of thought. The rigour or level of detachment that is characteristic of much of analytical philosophy, for instance, cannot necessarily be found in the philosophy of archaeology. On the other hand, as part of archaeology rather than philosophy of science, the epistemology of archaeology can appear as an antithesis to the practices of archaeology. The very concrete nature of archaeological materials and the pragmatic hands-on character of its

methodologies can render theorising redundant or distant for the concerns of the practising archaeologist. The immediate aim of this thesis, however, is not the construction of a systematic philosophy fit for the purposes of established forms of archaeology. Because philosophy can exclude nothing, it should never start from systematisation (Whitehead 1956, 2; Debaise and Stengers 2017). Following this sentiment, the thesis aims to highlight that a priori conceptualisations of what archaeology is or should be are epistemologically and ontologically untenable positions.

For the very same reason, the thesis does not aim to validate any of its necessarily eclectic theoretical and philosophical arguments against an existing body of factual archaeological evidence, material or literal. Rather, as belonging to the primary stage of investigation, the thesis is a collection of speculations and ‘partly-baked ideas’ (Good 1962; 1970), a clearing of conceptual ground for more fruitful ideas to flourish. As such the thesis should be read as an assemblage of fragmentary and introductory notes towards a speculative attitude in the philosophy of archaeology, hence, again, the choice of words in the title of the thesis. However, the fragmentary style should not be read as an apology for intellectual half-heartedness or theoretical undecidedness. Rather, the fragmentary style of the thesis highlights the fact that philosophies or theories are not monolithic systems or schemas that have to be followed dogmatically. *Theorising* as process—as opposed to *theory* as form or representation—always comes as weak and disjointed, mobile and decentred, or unfinished and fragile (Stewart 2008; Lucas 2015; 2019; Pétursdóttir and Olsen 2018; Sørensen 2018).

Although this thesis is first and foremost an exercise in theorising about theory, unfinishedness is also the capacity through which theories find their connection with things of a more concrete nature. “Like things, theory doesn’t simply add up and make sense” (Pétursdóttir and Olsen 2018, 113). I would feel worried if, in the end, theories, any more than things, did add up and made sense. Insofar as the aim of this thesis is the examination of the gap between archaeological things and archaeological practices on the one hand and archaeological knowledge and archaeological theorising on the other, it does so by highlighting that the archaeological process, whether practical or theoretical in nature, is characterised by an intimate sense of unfinishedness, uncertainty, wonder, and speculation. This is to say that the uncertainty and unfinishedness introduced by speculation are not to be taken as epistemological shortcoming that have to be compensated for by accumulating more data or by inventing increasingly rigorous procedures of experimentation and falsification (c.f. Achinstein 2019). There is, then, no clear distinction between facts-based knowledge and non-evidential speculation.

Ultimately, this thesis argues for a conception of speculation beyond its pertinence for either metaphysics or evidential reasoning. Speculation does not only address the past as the object of archaeological research but, through the examined pasts of the discipline, its imagined futures as well. The insecurities introduced by speculation and unfinishedness have to be seen as

opportunities for a more sensitive and considerate archaeology. The job of speculation in this context is to intensify the feeling that archaeology deals with a multiplicity of actual and possible matters of concern, both past and present.

PART ONE—INTRODUCTION

Any great new theoretical framework has an epistemological and an ontological aspect to its philosophy as well as an axiological one, and one needs to understand all three aspects in order to grasp the deep aspiration and idea of the theoretical framework. (Sørensen et al. 2011, 213)

1. Disciplinary context and aims of the thesis

In the history of the epistemology of archaeology, the archaeologists' conceptualisations of the nature and limits of archaeological knowledge are often contextualised within a framework of successive paradigms or intellectual traditions (Hill 1991; Lucas 2017). In the historiography of archaeology, the common rundown of these intellectual traditions often sounds like this:

For about a hundred years since the birth of modern archaeology in the 1830s, archaeologists mainly felt that archaeological knowledge is ultimately dependent on the careful collecting, description, and classification of archaeological material. For these so-called 'traditional archaeologists', knowledge of the past would follow as a matter of course with no need for a clearly formulated theory of knowledge or a method of explanation. Therefore, in epistemological terms, much of traditional archaeology was naively empiricist (Lucas 2012).

In the course of the 1950s, a group of young archaeologists started to question the naive empiricism of the traditional archaeology. For these 'new archaeologists', traditional archaeology's lack of a clearly defined method of explanation rendered it a matter of subjective impressions rather than objective (scientific) knowledge. In epistemological terms, New Archaeology aimed to be positivist rather than empiricist, and mainly subscribed to the principles of Hempelian philosophy of science. The principal goal of the new archaeologists, then, became the establishment of law-like regularities that would allow the causal explanation of past processes with a new level of certainty. David Clarke, one of New Archaeology's most famous proponents, has characterised the emergence of New Archaeology as the loss of disciplinary innocence and theoretical naivety (Clarke 1973).

Beginning in the late 1970s, however, as result of the emergence of postmodernism, the New Archaeology was superseded by what is generally referred to as 'interpretive archaeology' (Hodder et al. 1995). Members of the interpretive archaeology movement argued that the methodological purism, and the linked idea of objectivism, of the New Archaeology had led to a simplification of the subject matter. For interpretive archaeology, the task of the archaeologist was the

understanding of cultural diversity rather than the explanation of it by recourse to a specific method of inference. In epistemological terms, interpretive archaeology turned to a host of structuralist and poststructuralist theories—as well as phenomenology and hermeneutics—rather than philosophy of science for aid in understanding the diversity of past meanings. Those who did engage in matters of epistemology mainly argued that archaeological knowledge is result of a special kind of dialectics between archaeological facts and archaeological theories. In some sense, then, the interpretive archaeology can be seen as a return to the subjectivism of traditional archaeology (Harris 2018, 86).

Although this highly cliched view of archaeology as a succession of monolithic programs with possibly conflicting epistemological principles and research objectives is becoming increasingly less appealing as result of more nuanced and detailed research into the history of the epistemology of archaeology (Article 4, p. 37; Lucas 2019 is a good example), the division nevertheless highlights an important aspect to the discipline's history. Most importantly, the division reflects archaeology's fundamental epistemological anxieties ranging from the epistemic pessimism of traditional archaeology to the epistemic optimism of the New Archaeology and, ultimately, to the epistemic pessimism of the interpretive archaeology. In this sense, the division reflects the changing attitudes towards the relationship between archaeological materials and archaeological theorising, or observation of archaeological facts and knowledge of the past. And this is where the source for the oscillation between archaeology's epistemic pessimism and epistemic optimism lies. The aim of archaeology as a scientific discipline is to make knowledge claims that are based on facts, but because the observed archaeological evidence is contemporary rather than 'in the past', knowledge claims about the past become inferential rather than facts-based. In the epistemology of archaeology, this discrepancy between archaeological evidence and archaeological knowledge is commonly referred to as the 'interpretive dilemma' (Wylie 1989a; 2002; Lucas 2012; Chapman and Wylie 2016). If this dilemma is taken seriously, all archaeological knowledge can be deemed speculative rather than facts-based.

In the epistemology of archaeology, different strategies have been adopted to solve this dilemma or to compensate for it (c.f. Chapman and Wylie 2015; Lucas 2019). In the course of the history of archaeology, the compensation has taken place on two levels which could be called the epistemological level and the ontological level. The ontological level consists of the construction of cosmological regularities or ontological superstructures, a "metaphysical pathos" (Lovejoy 1964) through which the past and the present can be seen as metaphysically connected—or detached. If we return to our simple but useful division of the history of archaeology, for traditional archaeology the idea of an unchanging cultural ethos on the one hand and that of cultural evolution on the other provided the means of extracting knowledge from the archaeological material (Article 4; Pohjola et al. 2019, 27). In addition,

historical knowledge of the nature or character of a contemporary culture was taken as the reliable starting place for reaching into the past which, both in the ontological and the epistemological sense, was considered more or less fragmentary and partial (c.f. Lucas 2012). As result, the past became to be seen as an extension of history, albeit paradoxically simultaneously metaphysically detached from it due to the material nature of the archaeological evidence (as opposed to the textuality of historical sources), a fact that tended to render traditional archaeology a matter of subjective speculation (Smith 1955; Thompson 1956; c.f. Wylie 1989a, 19; Article 5).

For the New Archaeology, the interpretive dilemma was only an issue if one were to hold on to the empiricism of traditional archaeology. For New Archaeology, then, the major bridging concept between the activities in the past and the observation of archaeological facts in the present was that of process. Whereas traditional archaeology had largely hinged on the concept of Darwinian evolution, both in terms of natural and cultural change, the New Archaeology adopted a more detailed view of evolutionary processes. In particular, New Archaeology saw the identification of spatially specific yet universally causally determined processes as the prerequisite to understanding cultural change temporally. With the help of natural laws, and the observation of formation processes in the present, processual theory aimed to establish behavioural laws that could be used as covering laws in explaining the peculiarities in the archaeological material. The irony (and aporia) was that those laws that were supposed to explain the observed data were empirically derived from it, a shortcoming that brought the positivistic New Archaeology as an epistemological program to an end in the course of the 1970s (Article 4).

For interpretive archaeology, the ontological connections between the past and the present were human language, human cognition, and the human body as universal structural frameworks through which humans have rendered their experience meaningful and through which the ideas and experiences of past individuals can be recovered (see, especially, Leroi-Gourhan 1986; Articles 2 and 3). Although more recent iterations of interpretive archaeology have come to place increasing emphasis on the materiality of artefacts as the connecting medium, early interpretive archaeology in particular can be viewed as a return to principles of the idealist strand of traditional archaeology. In both, material culture is seen as an expression of ideas rather than as a means of adaptation to a natural environment, as was the case with New Archaeology. The thing that sets interpretive archaeology apart from traditional archaeology is the idea that, although we share a cognitive, intellectual, and bodily basis with the individual of the past, the past is simultaneously ontologically detached from the present because our experience, cognitive or bodily, is necessarily coloured or biased by the social and political realities of our time. For much of interpretive archaeology, then, this 'situatedness' of the researcher makes the past a matter of the present; a construction that is only

meaningful in the context of present ideological, political, social, or cultural realities (Article 2).¹

Some strands of contemporary archaeological theory can be seen as extensions of this anti-historicism of interpretive archaeology, and a number of authors have come to support the view that the past exists as a mode in and of the present rather than as the past (e.g. Hodder 2001; Lucas 2005; Harrison 2011; Olivier 2011). In this sense, the present can be seen as an unfolding of every moment in time; of every “material past” (Witmore 2015, 52), of each fleeting presence, and of all imagined futures. Recent iterations of interpretive archaeology therefore also share the empiricist standpoint of traditional archaeology, only with a somewhat different understanding of what empiricism means (see below).

It is important to notice that the uniformitarian constants presupposed in the ontological level by the respective archaeologies have been directly aimed to compensate for the uncertainties and insecurities that plague the interpretive dilemma on an epistemological level. The epistemological level, then, concerns conceptualisations of the nature of the intellectual or inferential process that takes place at the archaeologist’s end. In the course of the history of archaeology, these conceptualisations have tended to follow, in broad terms, the tripartite division into inductive, deductive, and abductive reasoning (Part Three; Article 3, pp. 72–73). The predominant form of inference in traditional archaeology is often seen as inductive (inference of rule or generalisation from observation of individual cases) whereas New Archaeology’s model of inference—fashioned along the principles of positivism—is fundamentally deductive (inference to the veracity of a hypothesis from observation and rule). Compared to New Archaeology, epistemological concerns were not central to the theoretical considerations of interpretive archaeology. However, those who did continue the epistemology program initiated by the New Archaeology mainly came to conceptualise the common forms of archaeological inference as variants of abductive inference (inference from observation to possible explanation, or inference by analogy) (Articles 1, 3 and 4; Part Three). Be that as it may, in general, interpretive archaeology marks the beginning of a widespread marginalisation of interest in matters of epistemology in archaeology, a trend that has brought the epistemology of archaeology to near extinction in the 21st century (Chapman and Wylie 2016, 30; Lucas 2019, 57).

The marginalisation of the epistemology of archaeology has mainly happened as result of the so-called ‘ontological turn’. The ontological turn forms a distinctive turning point in the intellectual history of anthropology and social sciences at large (Figure 1; Alberti and Bray 2009; Alberti et al. 2011; Alberti 2016a; Heywood 2017; Holbraad and Pedersen 2017; Domanska 2018). As a movement that mainly developed as a counterpoint to modernist

¹ Following this line of thinking, one can characterise the idealism of interpretive archaeology as a form of subjective idealism, against which the idealism of some strands of traditional archaeology appears as a form of objective idealism in which ideas are seen as habits in and of the world rather than as residing in individual consciousnesses.

or colonialist notions of culture and identity in indigenous studies and anthropology (Kohn 2015), the ontological turn has come to denote a more widespread appreciation of the uncanny, unexpected, and irreducible nature of the real and, by inclusion, of the objects of scientific research. Therefore, the movement is driven by the notion that the objects of research always remain irreducible to the researcher's adopted strategies of sense-making. In general, then, the ontological turn has resulted in increasing interest in forms of speculation rather than ways of knowing (Part Two).



Figure 1 The ontological turn. The occurrence of terms 'epistemology' and 'ontology' in published books in English between 1900–2008. The 1950s marks the beginning of increasing interest in matters of epistemology also in archaeology, while the turn of the millennium is characterised by increasing interest in ontological questions over epistemological concerns. *Google Books Ngram Viewer*.

In archaeological theory in particular, the ontological turn has resulted in the need to revise the discipline's established notions of ontological constants as well as its theories of knowledge production, signification, and meaning-making, but most importantly the dualist and modernist train of thought that these theoretical formulations are often founded on (Alberti et al. 2011; Harris and Cipolla 2017). In this sense, the ontological turn's shift in theoretical focus from representation to ontological sovereignty has challenged the pertinence of the highly formal approaches to archaeological inference that came to form the backbone of the epistemology of the New Archaeology, but also the inherently anthropocentric semiotic and hermeneutic approaches of the interpretive archaeology. After the ontological turn, the common critique has become that these theoretical positions are based on an unnecessarily clear distinction between the objects of knowledge (ontology) and the methods of knowing (epistemology) (Articles 2–4).

Moreover, although archaeology has always been a discipline of things, the recent interest in ontology has challenged the anthropocentrism of these epistemological approaches. The common argument in archaeological theory has become that the reductive anthropocentrism of archaeology ends up simplifying the variety of the past by treating it as an entity that can come to be objectively known or represented through established scientific methods or

theoretical concepts. The common notion in archaeology after the ontological turn, then, has become that, rather than resulting in increased levels of understanding, methods like excavation and typology or concepts like stratigraphy and origin may, paradoxically counter to their objective to make sense, turn out to be antithetical to understanding because the messy state is part of the very nature of the existence of the materials of archaeology (Gonzalez-Ruibal 2006, 121; Bogost 2012; Pétursdóttir 2017; Sørensen 2017). These concerns have mainly been voiced as part of the research on contemporary and emerging archaeological materials, such as nuclear waste and ocean drift matter (e.g. Holtorf and Högberg 2014; Pétursdóttir and Olsen 2018; Pétursdóttir 2019; c.f. Harrison and Breithoff 2017).

As already noted, the ontological turn marks a radical marginalisation of epistemological concerns in archaeological theorising, but rather than having resulted in total extinction of epistemology in archaeology, its questions have had to be rethought or redesigned. The epistemology of archaeology, in terms of direct relevance to the concerns of the ontological turn, has mainly taken form as a 'return to empiricism' (Articles 3–4; Hillerdal and Siapkis 2015; Witmore 2015; c.f. Marila 2018; Lucas 2019, 57–59). This return, however, is not a return to the empiricism of traditional archaeology, but is characterised by the idea that, unlike for traditional empiricism, knowing is not an operation between a knowing subject and a knowable object. Instead, the new formulations of empiricism in archaeology highlight that knowing also takes place between objects in the broader sense of the term, and that as much as our knowing of the world depends on its constituents it also hinges on speculations as to how the objects of our attention interpret each other.

To understand speculation as a form of empiricism is not necessarily an unanticipated twist. The meaning is apparent in the late Latin noun *speculatio* (observation) and the classical Latin verb *speculari* (observe, explore), both of which suggest an empirical rather than metaphysical meaning for the term speculation. However, the critical addition is a move from the descriptivism of traditional empiricism towards viewing empiricism in terms of its creative capacity. This entails a rethinking of epistemology as a form of anticipatory world-making; an entanglement of matter and meaning in which the two terms participate and co-constitute each other (e.g. Barad 2007; Kirby 2011).

For new empiricism, then, the epistemological practices of archaeology are seen not simply as descriptive of its evidence but also creative of its ontologies. This becomes evident in the sense in which new empiricism sees knowledge and interpretation as distributed operations in the world rather than simply limited to the relationship between being and thinking. As result, archaeology's theorists have come to question the pertinence of developing increasingly objective methodologies and instead underscore the importance of theoretical and methodological naivety and a sense of wonder in front of archaeological things in the hope that they can challenge or alter our established conceptualisations of them (e.g. Harrison 2011; Pétursdóttir 2012; 2014; Witmore 2012; 2014; 2015; Alberti 2016b; c.f. Lucas 2019, 58–59; see also Articles 3 and 5 for references and discussion).

The following statement characterises the entanglement between ontological and epistemological concerns in this position well:

The differences in the ways an archaeologist and a stream of melt water negotiate an abandoned mining town are of degree, not kind. Rushing water washing against concrete pillars will ‘interpret’ or ‘feel’ the concrete surface as well as any hermeneut or phenomenologist. (Olsen et al. 2012, 10)

In other words, the return to empiricism is marked by the idea that, in order to remain ontologically sensitive, the epistemology of archaeology has to include as meaningful not only those modes of experience and interpretation that characterise human experience of the surrounding world but also those which take place between archaeologically relevant materials and lifeworlds devoid of human presence. Hence the term ‘new materialisms’ that is used later in the thesis to refer to the type of speculatively oriented and ontologically sensitive archaeology outlined here (Witmore 2014; Moffat 2019). Because object-object relations are characterised by similar degrees of uncertainty and underdetermination to human interpretation, our understanding of these modes of interpretation remains speculative rather than explanatory. By extension, then, the return to empiricism also marks the beginning of a speculative epistemology of archaeology—hence the term ‘speculative turn’ discussed later in the thesis as a reference to the increasing centralisation of speculation in philosophy and archaeology after the ontological turn (Edgeworth 2016).

If the return to empiricism represents one half of archaeology’s epistemology after its marginalisation in the wake of the New Archaeology’s demise, the other half of it is directly linkable to those discussion in the epistemology of archaeology that brought down the New Archaeology as an epistemological program in the first place (e.g. Kelley and Hanen 1988; Wylie 2002). Whereas the new archaeologists argued that the most efficient method of archaeological inference follows the certainty of deductive reasoning, deductivism’s critics highlighted that archaeological inference takes place in a variety of forms of inductive and abductive reasoning. In particular, the view that the epistemology of archaeology is fundamentally inductive and abductive, rather than deductive, highlights that, instead of following a clearly laid out logical schema, archaeological inference takes place as a form of dialectics between materials, theories, and scientific practices (c.f. Chapman and Wylie 2015; 2016). In this sense, the objective of those scholars who stayed with archaeology’s epistemology has been to reconcile between the extreme forms of objectivism characteristic of New Archaeology and the extreme forms of relativism characteristic of interpretive archaeology (e.g. Hodder 1991, 10; VanPool and VanPool 1999; c.f. Wylie 1992). In this sense, recent engagements in evidential reasoning in the epistemology of archaeology are inherently linked to the concerns of the ontological turn through their interest in matters of multivocality, indigenous ontologies and epistemologies, and the

pragmatist view of knowledge as a matter of values and interests (e.g. Alberti and Marshall 2009; Nicholas and Markey 2015; Chapman and Wylie 2016; Domanska 2018). In general, then, this epistemological position can be characterised by the notion that “using a method of multiple working hypotheses that incorporates traditional knowledge-derived evidence can push archaeologists towards *unanticipated* conclusions, which thus increases objectivity” (Nicholas and Markey 2015, 301–302, emphasis original).

This thesis situates itself within and in response to the two recent strands of the epistemology of archaeology sketched above; the return to empiricism and the tradition of evidential reasoning. The primary sense in which the thesis should be seen as belonging to the ontological return to empiricism is that the thesis takes many of the philosophical considerations of the ontological turn as starting points for a speculative epistemology of archaeology. In general, these include, for instance, the idea that the materials of archaeology are inherently irreducible to the methods of archaeology, as well as the idea that archaeological knowledge is ‘emergent’, that is, more than the sum of its parts, of the materials, methodologies, theories, and practices of archaeology. However, whereas the return to empiricism is driven by the realisation that the commonly adopted epistemological strategies of archaeology can possibly end up simplifying or concealing the complexities of the past, the criticism is often put forward in ways that do not remain sensitive to the history of the discipline itself. The ontological turn, then, more often than not, is characterised by the dismissal of the deep history of the epistemology of archaeology. This is to say that attempts to reformulate the epistemology of archaeology along the principles of speculative thinking should also remain sensitive to the history of the discipline itself.

In connecting with the history of evidential reasoning in archaeology, much of the thesis aims to analyse the history of the epistemology of archaeology, but it does so by remaining critical of the tendency in the history of the epistemology of archaeology to see speculation as a point of elimination. Whereas the history of the epistemology of archaeology is essentially a history of the elimination of speculation in hope of greater degrees of certainty, this thesis aims to highlight speculation as a force of creation. The task of speculation in this context is to remain sensitive to the idea that the effects of pursuing a particular hypothesis or upholding a particular epistemological position are possibly partial to the creation of the past, not only representative of it. In this sense, this thesis seeks a position between scientific conceptions of objectivity and constructionist commitments to relativism. As pointed out by Moffat (2019, 4), speculation, although an important method to think beyond the immediately experienced or the commonly sensed, is not some positivist “miracle tool for messy issues”. There is therefore a continuing need for discourse on archaeological logic even within a speculative archaeology.

The central objective of this thesis, therefore, is to work towards an epistemology of archaeology that at the same time remains empirically sensitive to both the history of the discipline and the ontological concerns brought forward after the ontological turn. As such, the thesis explores the

role, nature, and limits of archaeology's epistemology after the ontological turn. The aim of the thesis is to sketch an epistemology of archaeology that is conservative enough to be rooted in the familiar but also radical enough to take speculation seriously as an epistemological notion. As pertains to these aims, the central question explored in the thesis is as follows:

What significance, if any, does speculation—both as an ontological and an epistemological notion—have in the epistemology of archaeology beyond its role as a point of eventual elimination?²

Contrasting against the paradigmatic genealogy of archaeology briefly outlined above, and in sketching an answer to the interpretive dilemma, this thesis argues that the future of archaeology is a speculative one. A speculative archaeology, in this vaguely paradigmatic sense, stands on the one hand as asymmetrical to the naturalism, scientism, and methodological monism of New Archaeology and its positivistic idea of symmetry between explanation and prediction (Article 4). On the other hand, speculative archaeology forms a clear counterpoint to the reductive anthropocentrism, social constructionism, and representationalism of interpretive archaeology (Articles 1–3, and 5). The starting point for the critique placed by speculative archaeology against preceding traditions of thought, however, is not a complete denial of reduction but rather the realisation that, to a large extent, the reductive strategies have been founded on clear cut dichotomies between world and mind, real and represented, or material and ideal. A speculative epistemology of archaeology wishes to avoid these ontological divisions as starting points (Articles 2 and 3).

Rather than to simply distinguish itself from the intellectual histories of archaeology, speculative archaeology, like all successive paradigms or disciplinary traditions, also combines elements from them. As a genealogical lineation, speculative archaeology is deeply sympathetic to the empiricism and impressionism of traditional archaeology (most importantly to its assumed theoretical naivety), but it also subscribes to some of the ideals of the epistemologically driven and methodologically ambitious New Archaeology (Article 4). The concept of process for instance is as central to speculative archaeology as it was to New Archaeology, but in a somewhat different sense of the term (Part Two; Article 2). Most importantly, speculative archaeology is also strongly affiliated with the ways in which interpretive archaeology has developed into during the recent ten or fifteen years with its methodological freeness oriented towards the 'mere description' of the diversity of the past rather than 'explaining it away' (Article 3). The concept of interpretation, for instance, albeit in a radically extended form, is as important for speculative archaeology as it was, and still is, for interpretive archaeology.

In explicitly philosophical terms, the thesis draws its inspiration from two traditions of thought: (1) the very broad genre of speculative philosophy, and (2) American pragmatism. The first, speculative philosophy, can be roughly divided into two schools. One is the type of speculative process philosophy put

² Fast forward to Conclusion for the short answer.

forward most notably by Alfred North Whitehead in the early 1900s and developed further in the course of the 20th and the 21st centuries by the likes of Gilbert Simondon, Gilles Deleuze, Isabelle Stengers, and Didier Debaise (Article 5). This so-called ‘constructivist’ approach to speculation as creation of concepts, ideas, techniques, practices, and other speculative devices, rather than speculation as metaphysical analysis, should be distinguished from the ‘speculative realist’ approaches that have come to dominate much of continental thinking during the recent 10 or 15 years (Article 3; Kouw and van Tuinen 2015; Wilkie 2018; c.f. Bryant et al. 2011a; Harman 2018b). While the designation ‘speculative realism’ can be a bit of a misnomer, this thesis draws much of its speculative inspiration from those strands of thought that can be loosely grouped under it. In addition to the various forms of new materialism and object-oriented ontology, Graham Harman’s object-oriented take on speculative realism in particular forms an important philosophical frame of reference. Article 3 in particular references Harman’s work and explicitly argues for an empirically sensitive philosophy of archaeology fashioned along the ontological principles of Harmanian speculative realism. Furthermore, although the constructivist Whiteheadian process philosophies and the object-oriented speculative realisms are no doubt very different in many respects, for example in their view of the relationality of the object, the intention of this thesis is not to seek out the ways in which the positions conflict. More important for a fruitful take on the importance of speculation in the context of the epistemology of archaeology is to emphasise the individual strengths of and possible similarities between these seemingly conflicting philosophical systems (c.f. Shaviro 2011; Ivakhiv 2014).

The second tradition of thought which forms an important philosophical backdrop for this thesis, and perhaps more so in terms of epistemology than ontology, is classic American pragmatism, especially as formulated by Charles Peirce towards the beginning of the 20th century. Peirce’s systematic philosophy has provided an important frame of reference for discussing the nature of archaeology as a science after the marginalisation of the epistemology of archaeology in the wake of New Archaeology’s decline (Articles 1–4). In outlining the scientific attitude for archaeology, Article 1, for instance, draws heavily from Peirce’s pragmatism, and the concept also receives increasing attention towards the end of this thesis (Parts Three and Four). Again, given that during the recent couple of decades, the ontologies and epistemologies of archaeology have been inspired largely by the aforementioned forms of speculative philosophy as well as pragmatism, and keeping in mind that these philosophical schools are connected in many ways, the underlying objective of the thesis has from the start been to seek out common ground rather than points of difference between these philosophical traditions (c.f. Crossland and Bauer 2017; Newell 2018). This is mainly achieved by an exposition of how the processes of inference and interpretation have been conceptualised in these philosophies. Whereas much of analytical philosophy of science has conceptualised scientific inference as either an inductive or deductive logical schema, speculative realism, process

philosophy, and pragmatism have emphasised the importance of open-ended philosophical systems. In terms of outlining the epistemology for a speculative archaeology, a critique of induction and deduction has been necessary to a certain degree. As an alternative, I have emphasised the relevance of abductive logic in the process in which things around us are made sense of, an approach that finds much of its impetus in pragmatism and speculative process philosophy, both of which have contributed to the emergence of archaeology's new empiricism (Article 3).

In contrast to induction and deduction, then, abduction highlights the need for an open-ended conceptualisation of knowledge production as process rather than form, a view that is well-established in pragmatism, process philosophy, new materialisms, and contemporary theories on the epistemology of archaeology. While the traditional positivist view of the epistemology of archaeology has tended to treat propositions or speculations as subject to testing, verification, or falsification against an observed factual reality, speculative archaeology sees speculation as the creative force behind scientific inquiry (Articles 4 and 5). This means that the whole process commonly referred to as science should be understood as partial to producing its own materials and its own facts rather than as a process separate from the object of research, and that the establishment of scientific facts remains a matter of anticipation. This, in turn, highlights the epistemic relevance of future anticipation rather than past explanation (Articles 1, 2, and 5). The result is not an epistemology in search of causal explanations or a theory of understanding, but one that sees both explanation and understanding as inherently anticipatory and uncertain. This view has become well established in archaeological theory and heritage discourse, mainly in the context of so-called Anthropocene thinking, a concept that highlights human history as an emergence or an unfolding between various forms of materials and processes—none of which are purely cultural or natural—with longstanding but inherently uncertain and unpredictable effects (González-Ruibal 2006; 2018; Dawdy 2009; 2010; Solli 2011; DeSilvey 2012; Holtorf and Högberg 2013; 2014; Edgeworth et al. 2014; Wurst and Mrozowski 2014; Harrison 2016; Harrison et al. 2016; Högberg and Holtorf 2016; Dawney et al. 2017; Högberg et al. 2017; Olsen and Pétursdóttir 2017; Pétursdóttir 2017; 2019; Ståhl et al. 2017; Brewer and Riede 2018; Domanska 2018).

2. Structure of the thesis

This thesis is based on five research articles, written between 2011 and 2018 and published between 2014 and 2018. Written over a period of eight years, the articles also reflect the personal development that has taken place during that time. Work that began in early 2012 as a monograph on abductive inference in archaeology and developed into a more general exposition of pragmatist philosophy and semiotics in archaeology finally saw light in form of individual articles that address those topics from different perspectives. In

order to further highlight the processual nature of the research, the five articles are presented in the chronological order in which they were originally written. Article 1 was prepared as a conference presentation for the 2011 Baltic Archaeological Seminar held in Tartu, Estonia, while Article 2 was prepared for the 2012 Theoretical Archaeology Group organised in Oulu, Finland. Both articles were later published in their respective conference proceedings. It should be noted that at the time of the completion of these articles, the thesis was still being prepared as a monograph. Nevertheless, most of the ideas presented in the articles are still relevant five years after their publication.

Articles 3–5 were prepared as journal articles intended for inclusion in the thesis, and they therefore better reflect the overall ambitions of the thesis. Like parts of the thesis, Articles 3–5, or parts of them, were presented at workshops, seminars, conferences, lectures, and other formal meetings throughout the writing of the thesis. Parts of Article 3 were presented at a workshop on abduction organised in Tallinn and Helsinki in 2014, at a conference on vagueness in Copenhagen in spring 2017, and at the 2017 meeting of the European Association of Archaeologists in Maastricht. Parts of what became Article 4 were presented in Helsinki in late 2016, as well as in Cambridge, UK, in the summer of 2018. Article 5 was originally prepared as a long talk for the Saxo Institute’s archaeology Friday seminar series in Copenhagen in late 2017, and the paper was developed into an article manuscript together with Tim Flohr Sørensen during 2018.

In terms of contents, Article 1 lays the foundations for a scientific attitude and an open-ended conceptualisation of the epistemology of archaeology. Drawing heavily from Charles Peirce’s philosophy of science, the article argues that, in light of the history of archaeology, a scientific attitude rather than a strict conceptualisation of a preferred scientific methodology is needed in order to retain an empirical openness that at the same time allows new observations to make sense (be meaningful) but also allows them to shape or alter pre-existing theories. It is argued in the article that a narrow conceptualisation of the scientific methodology ends up leaving a host of phenomena outside the scope of archaeology, and that instead an empirically sensitive philosophy and a fallibilistic and melioristic attitude are needed to compensate for methodological narrowness. While some of the ideas presented in the article have become less appealing to me over the years (especially Peirce’s at times almost aseptic view of scientific inquiry), the overall argument for fallibilism and meliorism in science fashioned along the lines of Peircean pragmatism remains extremely important (Part Four, Chapter 15). Some of the article’s main points are discussed further in Part Four of the thesis.

Article 2 similarly draws from Peirce’s philosophy but concentrates more explicitly on his semiotics. The article reviews archaeological conceptualisations of meaning as a semiotic concept. Again, in accounting for the history of archaeology, the article argues, through a discussion on what has come to be termed Hawke’s ladder, that the empirical attitude of traditional archaeology, contrary to the charges from its critics, retains a certain empirical

sensitivity towards the archaeological. The article argues that both the positivist view of the past as a collection of materials and events and the structuralist notion of meaning as an extra dimension added onto the material are based on the Cartesian distinction between mind and matter. Most importantly, the article argues that, to a large extent, the usefulness of semiotics for archaeology has been too hastily dismissed as anthropocentric by scholars subscribing to the philosophical principles of speculative realism and object-oriented ontology (c.f. Crossland and Bauer 2017; Newell 2018). In attempting to save semiotics from the charge of anthropocentrism, the article highlights that not all semiotics is semiology (cf. Saussure 1990). The article then proposes that the semiotic concept of habit as an evolutionary concept is critical for conceptualising semiotics as a valuable approach for an ontologically responsible epistemology of archaeology. Habit as anticipated rather than actualised and materialising rather than ideal forms an important ontological concept in the article and, it is suggested, an alternative to the synchronicity and hidden structuralism of the relationist strands of speculative thinking in archaeology. In other words, the article argues that materials are not expressions of ideas or a canvas to be filled with meaning, but rather that both materials and meanings exist as anticipatory. The philosophical considerations behind the article are discussed further in Part Two of the thesis.

Article 3 goes further into outlining an ontologically responsible archaeological empiricism after the speculative turn (see also Part Two). It is argued in the article that fundamentally intellectual conceptualisations of the process of archaeological research end up dismissing an important aspect of inference and knowledge formation, namely the role of senses and corporeality. The article therefore argues that much of archaeological knowledge is personal and tacit and therefore beyond logical evaluation or the intellectualism of critical analysis. In providing a take on ambiguity and vagueness as both ontologically and epistemologically relevant aspects to phenomena, the article proposes that an abductive 'logic of vagueness' is needed in order to create empirically sensitive but epistemologically systematic accounts of the past. While Article 1 laid some foundation for the role of abduction as part of the epistemology of archaeology, Article 3 further elaborates on the nature of abduction as an aesthetic and creative logic of vagueness. The article should therefore be read as a call for a return to empiricism in archaeology, only fashioned along some of the principles of speculative philosophy. In order to advance the attempts towards an empirically sensitive epistemology of archaeology, and keeping in mind that, in general, references to actual archaeological materials presented in the thesis are scarce, special effort is made in the article to showcase the relevance of tacit or bodily forms of knowledge in the analysis of Finnish Neolithic ceramics. The role of abduction in archaeology as a creative logic is further discussed in Parts Three and Four of the thesis.

Of all the articles, Article 4 is the most detailed foray into the history of archaeology, and should be read as a historical contextualisation of the

theoretical and philosophical considerations presented in the other four articles. Although the thesis in general aims to steer away from the tedious but common case study as an attempt to verify the proposed theoretical ideas against a specific concrete body of materials, Article 4 can be considered such a case study. By reviewing the few explicitly epistemological reactions by Finnish archaeologists to New Archaeology, the article argues that the common view of Finnish archaeology as atheoretical is misguided. The article highlights that the epistemological principles and objectives of the explicitly theoretical New Archaeology had already been considered in traditional Scandinavian and Finnish archaeology (or the Scandinavian variant of new archaeology) at the time of Anglo-American and British New Archaeology's introduction and dissemination in the late 1960s. Furthermore, regardless of the charge of naive empiricism by the proponents of New Archaeology, the article argues that not all traditional archaeology is theoretically naive in its view of the process of knowledge formation, but that the empiricism characteristic of traditional archaeology is to some extent congruent with some of the principles outlined for a speculative archaeology in this thesis. It is argued in the article that the relative slowness of Finnish archaeology in matters of archaeological theorising should be seen as a form of deliberate and systematic openness or empirical sensitivity that resists theoretical reductionism and methodological simplification. In light of the recent developments in archaeological sciences, the addressed theoretical sensitivity can contribute towards a more epistemologically sensitive and ontologically inclusive archaeology. The social implications of the results of this article are discussed in Part Four of the thesis.

Article 5 is an explicit call for the conceptualisation of the methodology of archaeology as intimately speculative rather than based on hypothesis-testing. The article is theoretical and speaks for the deep irreducibility of speculation in archaeology by highlighting the discipline as a practical, material, and empirical philosophy in itself. In order to highlight archaeology as a material philosophy, special reference is made to the speculative philosophy of Whitehead and, more importantly, to recent new materialist archaeological theorising. Through the concept of the possible, the article argues that speculation should be considered as a force of creation rather than as fuel for hypothesis-testing, and that the job of speculation is to keep the epistemological system of archaeology open to possibility rather than elimination and/or proof. Speculation in this sense can be seen as a method of "questioning, doubting and wedging in other possibilities than those canonised or currently verifiable" in archaeology (p. 4 of Article 5 manuscript). The considerations presented in the article are discussed in further detail in Part Two (in regard to the ontological considerations), Part Three (in regard to the history of the epistemology of archaeology), and Part Four (in regard to the broader social implications of speculation in archaeology and science) of the thesis.

The contents of the original articles and the implications of their results for the future of archaeological theory are elaborated, discussed, and summed in

the course of three parts and a short conclusion. In light of the views expressed in the original articles, some concepts have resisted the oscillations of academic trends better than others during the nearly ten years in which the articles were written, and may appear today as more important than others for the task of outlining a speculative epistemology of archaeology. While the concept of speculation was not initially central to the work, it came to serve as an umbrella term for the ideas presented in the individual articles. In addition to serving as a connecting concept for the articles, speculation, as well as other connected concepts such as causality, emergence, and aesthetic interpretation, also mark a gradual shift in narrative focus from ontological to epistemological concerns in Part Two and Part Three, and finally to their more explicit synthesis in Part Four. These parts, then, take the concept of speculation as both a point of departure as well as a point of connection in discussing the many perspectives raised in the five articles. In this sense, the thesis seeks to move beyond simply repeating the arguments presented in the articles, and special effort is made to contextualise the articles in a broader narrative framework of both philosophy and archaeology, but also to discuss the relevance of their results in the more general context of science.

Part Two is a general exposition of the important ontological (but also epistemological) considerations of archaeology after the ontological turn, most importantly in terms of the new materialisms' and speculative realism's impact in archaeological theorising, but the part also explores the common ground between new materialisms, speculative realism, and the process philosophies of Whitehead and Peirce, most importantly in terms of Whitehead's speculative philosophy and Peirce's semeiotic. The part begins by introducing the effects of the emergence of new materialisms and speculative realism in archaeology, and explores the nature of interpretation in light of such central concepts as causality, emergence, and aesthetics. The part argues that, contrary to the uniformitarian conceptualisations of the ontological constants in the epistemology of archaeology, interpretation is an undetermined and emergent process. Interpretation, then, both in terms of material and immaterial relations, is understood as a process of aesthetic causation and aesthetic translation rather than as either a form of mechanical causality (material) or an activity of the mind (immaterial). The ontological concept of 'transduction' is introduced in elaborating on the nature of causality as an interpretive operation in the ontological sense, but the concept is also explored in order to highlight the interrelatedness of ontology and epistemology as fundamentally aesthetic. It is argued in the part that the sense in which transduction is understood in speculative realism and process philosophy as an aesthetic force of creation is actually an ontologised version of Peircean abduction. The part then also argues that the sense in which the object of inquiry withholds itself in Peirce's conceptualisation of semiosis connects his philosophy with particular aspects of Harmanian speculative realism, a point that has been missed in the 21st century critique of the applicability of semiotics in archaeology (Article 2).

Part Three turns from the ontological discussion more explicitly to matters of epistemology and is an exposition of the history of the epistemology of archaeology. The main objective of the part is to demonstrate that the general thrust of the epistemology of archaeology has been to treat speculation as a point of elimination. In particular, the part reviews the history of archaeological inference from the viewpoint of the common conceptions of the process of knowledge production, namely induction, deduction, and abduction. Again, rather than reiterating the arguments made in the original research articles, the part focuses on topics that remain inadequately exposed in them. In addition to providing a more informative account of the history of the epistemology of archaeology, the differences between induction and abduction in particular receive special attention in the part. As a conclusion, the part introduces a general typology of archaeological inference.

Part Four is a synthesis of the considerations presented in Part Two and Part Three. By remaining faithful to the ontological considerations presented in Part Two, the objective of Part Four is to argue for the relevance of speculation in the epistemology of archaeology beyond hypothesis-testing. Following the ontological principles set in Part Two, and in expanding on the epistemological discussion provided in Part Three, Part Four explores the epistemological significance of speculation beyond its metaphysical relevance. The part then argues for a correspondingly loose, vague, and open-ended understanding of the epistemology of archaeology. The part includes a general closing discussion on the implications of adopting a speculative attitude in the epistemology of archaeology. Most importantly, the part argues that a science founded upon the principles presented in the thesis is an inclusive science that can take into consideration those alternate modes of existence and understanding that tend to fall outside the scope of the narrow scientific understanding of the real. In particular, the part discusses the concept of epistemological open-endedness, but in order to avoid common sense realism, the part argues that a sense of epistemological hesitation is needed. The part then makes a case for a 'slow archaeology' and proposes practical countermeasures for the increasing reliance on the testimonial power of natural scientific methods in archaeology, a development that has tended to render the methods of the humanities unreliable and speculative, unless corroborated or verified by scientific methods. The resulting slow archaeology, it is argued, is a civilised archaeology that moves beyond dominant conceptualisations of the methodology of proper science as the prerequisite for reliable knowledge as well as the ensuing forms of epistemological and ontological dominance in the politics of science.

Finally, the main parts are followed by a Conclusion that briefly recapitulates the main arguments and results of the thesis.

PART TWO—THE SPECULATIVE COMPONENT

There is no such thing as an isolated fact: [...] Hence any experience, however factual, is saturated with interpretations, ideas and multiple links. (Debaïse and Stengers 2017, 15)

3. Withdrawnness of objects

The views expressed in this thesis should partly be seen in the context of the wider development that has taken place in the sciences and the arts during the end of the 1900s and the early 21st century. This development, generally placed under the wide and vague umbrella term ‘new materialisms’, is marked by a renewed interest in the material rather than the ideal (e.g. Dolphijn and van der Tuin 2012; Witmore 2014; Hodder and Lucas 2017; Cipolla 2018). As such, new materialisms can be seen as a reaction to the development that took place in the humanities in the latter half of the 20th century as result of postmodernism. Counter to the idealism and social constructionism of postmodernism, the new materialist conviction in archaeology entails that archaeology should develop ways of theorising that do not reduce phenomena to signs, text, discourse, or other inherently human, ideal, or social constructs, as was common in the archaeological theory of the 1980s and the 1990s (Olsen 2003). Furthermore, the criticism from new materialisms is not limited to the constructionism of interpretive archaeology. The scientism and logical formalism of New Archaeology has similarly been subjected to critique by those archaeologists who seek to develop materially sensitive ways of conceptualising knowledge in archaeology. As result, the positivist epistemologies of New Archaeology and the structuralist or poststructuralist theories of signification and representation characteristic of interpretive archaeology have become replaced with ontologically sensitive, non-anthropocentric, and non-dualist ontologies (see especially Harris and Cipolla 2017 for an introduction to the history of dualist thinking in archaeology, and González-Ruibal 2013 for a collection of essays that outline an archaeology beyond the tropes of modernity). In broad conceptual terms, new materialisms in archaeology, like in philosophy, can be seen as a shift from epistemology to ontology, or rather as an increasing acceptance of the deep entanglement of these concerns.

In the epistemology of archaeology, the material turn, with its idea of entanglement between epistemology and ontology, has entailed a need for novel conceptualisations of the distinction between the material and the ideal. As an attempt to move beyond predominantly hierarchical conceptualisations of the relationship between the object of knowledge and the process of

knowledge production, the relationship between the material and the ideal has in the new materialist archaeological theory in the early 2000s been discussed partly in terms of a 'relational ontology'. Although relational ontology has a much deeper pedigree (Benjamin 2015), important philosophical influences for early relational thinking in archaeological theorising have included, for example, Bruno Latour and Manuel DeLanda. The philosophies of Latour and DeLanda have challenged the modernist idea of science as an ontologically neutral epistemological activity. Instead Latour's and DeLanda's conceptions of relationality have emphasised the entangled and inseparable nature of technologies, societies, things, and knowledge practices. Latour's Actor Network Theory (e.g. 1987) and DeLanda's assemblage theory (e.g. 2006), in particular, contributed towards the emergence and development of a variety of so-called 'symmetrical' approaches in archaeology during the early 21st century (Olsen 2003; 2007; 2010; Witmore 2004a; 2006; 2007; Normark 2006; Ingold 2007; Webmoor 2007; 2012; Shanks 2007; Webmoor and Witmore 2008; Hodder 2012; Lucas 2012. See also, for example, Harrison 2011; Hamilakis 2013; Barrett 2014; Harris 2014; Alberti 2016a; Bille and Sørensen 2016; Miller Bonney et al. 2016; Hamilakis and Jones 2017).

Although initially, symmetrical archaeology developed as a branch of social archaeology, it has, somewhat ironically, been marked by increasing interest in the material rather than the social. Nevertheless, the objective of symmetrical archaeology has been to reconsider the material extent of the social. Whereas earlier studies of materiality in social archaeology tended to treat the material as an expression or mediation of the social, or people and things as a type of agential dialectics (e.g. Gell 1998; Meskell and Preucel 2004; c.f. Knappett 2012), symmetrical archaeology wanted to dissolve the idea of mutual intentionality that was built into these early theories on materiality (Olsen 2003; Webmoor and Witmore 2008). The crucial step, then, was to avoid the bifurcation between things and people in the first place. As result, material relations became seen as symmetrical to rather than as a function of social relations. In this sense, symmetrical archaeology as social archaeology sought to formulate an ontologically responsible conceptualisation of materiality as an element of the social realm, a point that is also crucial to outlining the backdrop of this thesis (see also Article 3).

Nevertheless, in trying to conceptualise human-thing relations from a flat, non-hierarchical perspective, symmetrical archaeology was charged for flattening out other important distinctions such as animate/inanimate, and intentional/non-intentional (see Olsen and Witmore 2015 for a recap of the critique). According to the critique, conceptualising humans as yet another category of things risked rendering notions such as change, power, or ethics redundant. In order to react to the critique, more recent iterations of symmetrical archaeology have adopted a somewhat altered conception of relational ontology. Whereas symmetrical archaeology was initially fashioned on Latour's early relational ontology that saw things as relational through and through, more recent formulations of symmetrical archaeology draw partly from the speculative realism of Graham Harman and especially his idea of

‘withdrawnness’, meaning that objects retain an inner reality that remains withheld from all relations (e.g. Harman 2002; 2005; Olsen and Witmore 2015; For the distinction between early and late Latour see, for example, Harman 2009; 2014).

When Harman (2002) argues that things are not simply sums of relations between their constituents but withdraw or withhold from these relations to a certain degree, he makes an ontological distinction that is as critical for the objectives of symmetrical archaeology as it is for the aims of this thesis. Because all objects remain to an extent withheld from relations, they resist reduction to their social effects, such as ethics or politics for instance. On the contrary, according to some proponents of symmetrical archaeology, we have a special kind of epistemological mandate to care for things by resisting their very humanisation (Domanska 2006; Olsen et al. 2012; Pétursdóttir 2012; Webmoor 2012; Witmore 2012; c.f. Sørensen 2013).³ In this sense, withdrawnness as the inexhaustible source of ontological novelty is an important concept for outlining an epistemology that can account for novelty as an ontological notion.

In many ways, the evolution of symmetrical archaeology reflects the development that has taken place in new materialist and speculative philosophy from the material semiotics (Law 2004) or material hermeneutics (Ihde 1998) of science and technology studies to speculative realism during the recent 15 years (c.f. Bryant et al. 2011a). Whereas the early (post)structuralist currents of new materialist philosophy emphasised relationality with the expense of essence, recent speculative attempts to think about relationality have attempted to avoid this distinction altogether (Article 2; Fowler and Harris 2015).⁴ Contemporary symmetrical archaeology then adopts the idea of the withdrawnness of things as a counterstrategy and argues that, although there may be things that do not concern themselves with ethics, there is no realm of ethics that is free from material entanglements (e.g. Olsen et al. 2012; Olsen and Witmore 2015; see also Edgeworth 2016; Campbell et al. 2019). Olsen and Witmore (2015, 191) elaborate on this position: “Humans are thingly beings among others, but that, of course, does not imply that we deny the differences that distinguish us from other beings.” And they continue:

For the record, symmetrical archaeology embraced, from the beginning, the irreducibility of things—no thing can be exhausted by any other thing—and this was closely connected to the notion of manifestation, of translation, as a counter to reductive understandings of representation.

³ It should be noted that, unlike early Latour, DeLanda’s take on relational ontology does not reduce its constituents to relations (e.g. DeLanda 2011; c.f. Fowler and Harris 2015; Hodder and Lucas 2017).

⁴ Interestingly for the epistemology of archaeology, this development also parallels the oscillations between natural sciences (essence) and humanities (relation). While archaeology as a balancing act between humanism and scientism has tended to adopt structuralism and positivism as its theoretical framework, the humanities have tended to draw much of their inspiration from poststructuralism. Speculative philosophy interestingly inherits fragments of poststructuralist thought, mainly in form of the critique of the network, and symmetrical archaeology has followed suit. It would, however, be misguided to characterise symmetrical archaeology as poststructuralist; a more fitting term would be ‘posthumanist’. See also Articles 2 and 3.

It has always emphasized how all entities in the world are equally thingy, but this is not a denial of difference. Quite the opposite, in fact. Both relationality and non-relationality are to be held in symmetry. (Olsen and Witmore 2015, 194)

Or, as Chris Witmore writes in a more recent recapitulation of symmetrical archaeology,

[s]ymmetrical archaeology radically recomposes the definition of things, not as objective matter against subjective qualities, not as the relational opposed to nonrelational, not as the nonhuman counterpoised to the human—things have no opposites—but rather as autonomous entities or units that cannot be broken down into their components or reduced to their effects. (Witmore 2019, 2)

In this sense, the object-oriented ontology (OOO for short) version of symmetrical archaeology is not only motivated by seeking ontological symmetry between humans and things, but also the asymmetries and inequalities that haunt the relationships between all things (see for example Harman 2018a, 112–113; Campbell et al. 2019). An archaeology fashioned along the principles of speculative realism then asks “how much do we really know about the objects we think we are familiar with? What further as yet unknown aspects will one day reveal themselves, or recede, or remain forever untapped and buried in the object’s withdrawn inner core” (Edgeworth 2016, 96)?⁵

4. Necessity of contingency

Before further discussing the principles introduced by new materialist or speculative realist archaeologies, it is worth noticing that they find much of their impetus in the so-called ‘speculative turn’, a term that part of the multifaceted new materialist and object-oriented speculative philosophies of the 21st century are often grouped under. In terms of the historical significance of the speculative turn, Bryant and his colleagues (2011b, 1) see the term as equivalent and reactionary to the linguistic turn of early 20th century. As such, the speculative turn seeks alternatives to both the analytical tradition, most notably logical positivism, as well as structuralism, poststructuralism, and other traditions that centre around text and discourse, but also phenomenology due to its centralisation of the human body (e.g. Avanesian and Malik 2016). The shared objective in the arts after the speculative turn,

⁵ One distinction to be kept in mind at this point is that between speculative realism and scientific realism. Although the two share the conviction that reality exists as independent of observation, they are separated by the degree to which they see reality as knowable. Whereas scientific realism holds that the real can be modelled, constructed, and approached by using scientific methods, speculative realism claims that the only way to orient towards the real is through metaphor, even though it can never be directly encountered (c.f. below).

then, has become the decentralisation of the human agent, as we have seen has been the case in the corresponding strands of archaeological theorising as well.

In addition to Graham Harman's object-oriented speculative realism, a similarly influential figure in contributing to the speculative turn has been philosopher Quentin Meillassoux (Articles 2 and 3). In *After Finitude*, Meillassoux (2008) coins the term 'correlationism' to refer to the view characteristic of Western philosophy that thought and existence are inseparable. According to Meillassoux,

one could say that up until Kant, one of the principal problems of philosophy was to think substance, while ever since Kant, it has consisted in trying to think the correlation. [...] During the twentieth century, the two principal 'media' of the correlation were consciousness and language, the former bearing phenomenology, the latter the various currents of analytic philosophy. (Meillassoux 2008, 6)

These correlationist philosophies, in Meillassoux's view, have failed in thinking the essential and instead have sought to seek out whether mathematics, natural laws, logic, language, divinity, history, thought, the body, or some other superstructure could be considered as the most originary correlation. Avoiding correlation, therefore, has become the uniting objective for the speculative turn, and speculation in this context means more than simply hypothesising; it refers to thinking beyond human finitude (Meillassoux 2008).

The defining question for Meillassoux's speculative philosophy becomes how to think that which lies beyond thinking, how to think about the essential independently of the relation between being and thinking? Although the question appears paradoxical and sophistic at first, Meillassoux ties it to the questions of modern science by problematising correlation in relation to what he calls 'ancestral questions'. Broadly speaking, the subject matter of ancestral questions predates human consciousness altogether. In effect, the questions posed by cosmology, geology, or palaeontology that deal with matters of extreme temporal distance belong to this category. The problem of ancestrality then entails whether ancestrality can ever be thought of as meaningful in-itself rather than as ultimately meaningful only for the cosmologist, for the geologist, or for the palaeontologist. In the context of archaeology, the problem of ancestrality entails a division between being able to think of the past either on its own terms or as reductive to or as representational of the 'for us'. For Meillassoux, this 'for-us' is the codicil or addendum that prevents the correlationist from breaking free from the 'correlationist circle' which is held together by the idea that, even if we do believe in a reality that exists independent of our thinking, we can only grasp that reality by thinking it. In other words, we cannot think something existing outside thought without turning it into a thought, thereby committing a pragmatic contradiction (Meillassoux 2012).

However central to the speculative turn, the views put forward by Meillassoux have by no means been generally accepted. One central argument in the criticism has been that correlationism is a straw man, and that the problems identified by Meillassoux have been widely acknowledged and addressed in post-Kantian philosophy, equally in hermeneutics and phenomenology as well as within the analytical tradition. As Peter Hallward (2011, 137) notes, even for an idealist there is little difference in principle between thinking what happened six billion years ago from thinking what happened yesterday. The same is undoubtedly true for archaeology. “Geologists and archaeologists need to infer independent and prior existence of things irrespective of the date of the evidence they happen to be working with, whether or not it contains traces of humans or other living things” (Edgeworth 2016, 105). The real problem, then, is not that the correlationist would not be able to think that which predates thinking. “[U]ntil Meillassoux can show that we *know* things exist not only independently of our thought but independently of our thinking them so, the correlationist has little to worry about” (Hallward 2011, 138, my emphasis; c.f. Meillassoux 2012). In other words, part of the critique aims to point out that thought can mean two different things. On the one hand, to think of something is to make it present to the mind, but on the other hand to think something is “to point at its reality insofar as it lies beyond its presence to the mind” (Harman 2011, 67).⁶

Whether correlationism is a straw man or not is of little consequence. The potency of Meillassoux’s philosophy lies elsewhere. In his attempt to break free from the correlationist circle, Meillassoux reconsiders the concept of contingency. Meillassoux argues that the ‘finitude’ of thought postulated by correlationism is result of thinking of necessity as absolute; necessity is what gives rise to the idea of the intellect as finite (see, also, Whitehead 1956). For the correlationist, then, the laws of nature or of logic are determined by the idea of the necessity of a superior law while, for the anticorrelationist,

[e]verything could actually collapse: from trees to stars, from stars to laws, from physical laws to logical laws; and this not by virtue of some superior law whereby everything is destined to perish, but by virtue of the absence of any superior law capable of preserving anything, no matter what, from perishing. (Meillassoux 2008, 53)

Meillassoux thus argues that only contingency is absolutely necessary, and he suggests that the chief concern of philosophy should not be what must be, but instead what may be (Hallward 2011, 130). As Hallward again teaches us, in Meillassoux’s philosophy,

⁶ The criticism is partly misleading because Meillassoux also contends that we cannot break free of the correlationist circle even if we wanted to (e.g. Harman 2018b, 124–125). See also Kouw and van Tuinen (2015), who charge Meillassoux for upholding a type of scientism. This charge is based on the fact that Meillassoux, following his teacher Alain Badiou (2004), considers mathematics as the method for attaining the absolute (c.f. Harman 2018b, 139). Whether *After Finitude*, or Badiou’s *Infinite Thought* for that matter, can really be read as a glorification of hard sciences remains an open question.

[r]ational reflection encourages us to posit the absence of sufficient reason and to speculate about the potentialities of this absolute time: it is only our experience, precisely, that holds us back. Our ordinary sensory experience discourages us from abandoning a superstitious belief in causality. (Hallward 2011, 133)

The main question for a speculative philosophy then becomes, how one could become free of the confines of experience in order to speculate on what experience could entail beyond its imagined confines?⁷

An important implication of Meillassoux's philosophy for the type of speculative archaeology outlined in this thesis is that phenomena can and should be thought of as radically underdetermined. Because any particular cause could give rise to a multitude of different events, an event cannot be explained with recourse to a particular general cause (Meillassoux 2008, 88). This asymmetrical conceptualisation of causality, founded upon the principle of absolute contingency and the conversion of Hume's problem of induction into an opportunity, positions Meillassoux within the realm of speculative realism (Hallward 2011). Furthermore, in this context, the term realism in Meillassoux's speculative realism is not a reference to that which predates thinking, but rather to what comes after thinking: a fact can only be described, not founded (Meillassoux 2008, 39).⁸ I will return to the implications of radical underdetermination for the epistemology of archaeology in Part Four.

5. Causality and aesthetic causation

The idea of radical underdetermination goes right to the core of modern science and challenges one of its underlying ontological principles, the idea of causation. All scientific (or scientifically credible) thinking can be said to hinge on the idea of the cosmos as a Newtonian machine-like system where the turn of one cog results in corresponding degrees of revolution in others. In this sense the system is governed by a rule of causation; any effect can be reduced or tracked to a particular cause, and, furthermore, that cause will have similar effects in the future. Causality is therefore also a central ontological concept for the epistemology of archaeology (c.f. Marila 2013). The importance of causality in archaeology's epistemology has mainly been researched as a component of archaeological explanation, and in this respect, especially in New Archaeology, explanation has relied on the law-likeness of causal

⁷ Arguments similar to Hallward's have been made by Harman (2018b, 139–140), who notes that Meillassoux treats correlationism as a matter pertaining to time rather than space. In other words, whereas Meillassoux sees contingency and the evolution of the laws of nature as an event, Harman contends that there is no reason why, at any given instance, different laws could not govern different parts of the cosmos. This view is in accordance with Harman's anticorrelationist philosophy where real objects exist independent of their shared relations.

⁸ Furthermore, Meillassoux's insistence on causation as an aesthetic register that calls for description rather than explanation connects Meillassoux in part to the speculative philosophy of Alfred North Whitehead (Shaviro 2011; Thomas 2017). See also Whitehead (e.g. 1956) for the myth of finite facts as the basis for the idea of the finite intellect.

processes as the connecting ontological constant between the present and the past (Salmon 1982; Gibbon 1989; Wylie 1989a; Articles 2, 4, and 5). The cause, then, in order to be necessary rather than probabilistic, would have to be 'natural' rather than 'cultural' because cultural causes can be regionally specific and arbitrary. In this sense, causal necessity or universal law-likeness is an ontological rather than an epistemological claim. In Article 2, I explicitly argued that those universal constants that we normally tend to conceive as laws of nature are nothing more than habits of acting, however slow-changing. This is an important cosmological notion that should be kept in mind when considering how novelty is possible in the first place and how interpretation, in the widest sense of the term, has to be anticipatory in respect to this novelty.

What correlationism highlights is that modernist dualist ontologies are founded on a distinction between causation and interpretation, or the idea that reality is a system governed by the immutable rules of physical causality, while the human subject or the human interpreter gradually comes to know these laws through empirical observation, and devises causal explanations accordingly. Interpretation in this sense is seen as fallible in a way that the physical reality is not, and interpretation is seen to be governed by different rules than the mechanical universe.

This is the context in which Artur Ribeiro (2018a; c.f. 2018b) has criticised the use of causal explanations in archaeology and instead calls for a type of anthropological holism. Anthropological holism sees explanation not as based on mechanistic causation or a priori conceptions of the law-like causes behind action. Instead, anthropological holism accounts for the historical delineation of discrete or particular social habits. The starting point for this view is that all action is oriented towards producing some sensible effect. Being able to understand these future-oriented causes behind particular activities requires knowledge of the context and conventions that are connected to that particular activity. It is, for example, possible to explain the production of specific shapes in rock art with reference to particular physiological or neurological states, but this reference to some quasi-mechanical causation is only part of the explanation. It does not, as such, explain why the rock art was done, it only connects them to one process, dismissing the cultural and social histories that gave rise to the possibility of producing rock art in the first place. If an activity is to be explained, the explanation should include these historical particularities (Article 2). Needless to say, these historical particularities include not only the social, cultural, or political context under study, but also the understanding of the mental states of the individuals that belong to, have developed with, and make sense in that particular historical context (Articles 3, and 5).⁹

⁹ Interestingly, Simmel, in his philosophy of history, referred to understanding (in contrast to explanation) as a form of empathy, a method characteristic of the humanities, but especially of arts and in the process of relating oneself to the object of the aesthetic experience because our bodies retain the acquisitions of many thousands of years of evolution (c.f. Schwartz 2017). In Georg Henrik von Wright's view (1971), the Simmelian differentiation between explanation and understanding introduces intentionality as a causal register different from how causation is usually understood in explanation. Note that, in the context of archaeology, Binford (1977, 1), for instance, saw archaeological explanation

Following this line of thinking, Ribeiro (2018a) gives an account of the difference between causal and intentional causation. If, as in Ribeiro's example, the feeling of danger that the presence of a tiger, for instance, incites is attributed not to the inherent quality of the tiger to be dangerous but instead to the relation between the tiger and another subject that capacitates the feeling of danger to take place, then we can say that the relation is an intentional one; the tiger is only dangerous to something or someone in particular. "Therefore, all intentional actions like fear, hate, love, etc. must be actions towards an external object, and not the product of the subject itself" (Ribeiro 2018a, 111). This is why Ribeiro refers to the relation between subject and object as triadic. In addition to the subject and the object, the relation includes what Ribeiro calls 'context of intelligibility' (Ribeiro 2018a, 113). This triadic relation then concerns not only the relationship between the object and the subject, but the historically meaningful context of the activity (c.f. Ribeiro 2018b, 105). The subject itself, whether the mind or the agential organism, are composed of multiple triadic relations. Ribeiro, in reference to Vincent Descombes (2014) refers to these relations as 'institutions of meaning'. In this sense societies consist of multiple centres of experience that nevertheless form a superior centre of experience, such as the human individual. It makes no sense to assign meaning or causal or intentional agency to any one centre of experience as superior in relation to other parts. Rather, these centres make sense as relational, or, to account for the aspect of intelligibility, more precisely as habitual (Article 2). They are brought or bound together by habits of action:

The key difference between anthropological holism and a priori theories of human sociality [...] lies in the role the past has in relation to a given present—with anthropological holism, a discrete group of people behave in a certain manner because their history led them to that behaviour, while a priori theories establish the behaviour of discrete groups of people regardless of their past. What this means is that a priori theories ignore particularities—they are merely the results of other social forces and not considered as social forces themselves. A social archaeology that does not analyse particular history and the events that might have changed the course of history of a given group of people will inevitably equalize economic and social-cultural individuals across the board [...]. (Ribeiro 2018a, 117)

The concerns expressed by Ribeiro echo the well-established distinction between essence and relation, subject and object, or being and becoming, which in turn partly constitutes to the troubles in being able to think of the object of archaeological inquiry as a process similar to the actual process of knowledge production. It is therefore important to notice that Ribeiro's processual view of meaningful human action, as well as its meaningful study, is based on a rather unorthodox understanding of the term subject.

as a prerequisite for understanding the past subject, whereas the main motivation behind interpretive archaeology was to sidestep the problem of explanation by stressing the prehistorian's obligation to understanding.

The sense in which Ribeiro understands the subject as processual-historical rather than static can be clarified by Didier Debaise's (2017b) distinction between two meanings of the term. On the one hand, Debaise refers to subject as *subjectum*, that extent of the term which underneath all of the changing appearances and relations retains itself. This is the core of subjectivity from which the relational emanates (Debaise 2017b, 54). The *subjectum*, then, is that which feels and comes to form 'superimposed subjectivities', or societies in Whiteheadian terminology (Debaise 2017b, 56 refers to Whitehead). These societies are what Ribeiro, in reference to Descombes, refers to as institutions of meaning. On the other hand, Debaise (2017b, 57) refers to subjectivity as *superjacio*; the subject not as a fully realised subject, but rather as an unrealised tendency or becoming. Debaise, however, in a pragmatic fashion opts for the concept of 'manner'. Manner, then, is an evolutionary tendency to feel or witness in a prehensive fashion. Debaise writes that the manner is how a subject 'prehends' the anterior world or how it captures or integrates the anterior world in what it is to become.

The sense in which Debaise refers to the subject as an unrealised tendency follows Whitehead's idea of the 'eternal object', or the 'how' of becoming into relation (Whitehead 1978; c.f. Harman 2010, 38). In Whitehead's cosmology, there are two types of objects, actual entities, and eternal objects (Whitehead 1978, 25). While actual entities can be characterised as singular occasions of becoming, eternal objects provide the universal qualities and relations and in doing so are also fundamental creative causes for actual entities (Whitehead 1978, 40, 166). "At each 'moment,' the universe contracts into a multiplicity of points of perspective that are these new subjectivities" (Debaise 2017b, 63).

This starkly distances Debaise's position from the conceptualisation of causation as bifurcated into interpretation (or what we may term vague or uncertain causality) and causation (or mechanical and law-like causality).¹⁰ By the same token, Debaise also provides a reading of Whitehead's society as the mediation between simple forms of causality and interpretation. As Isabelle Stengers contends, the "role of Whiteheadian societies is to produce this mediation, that is, to provide the environment that 'our' creative experiences require, while at the same time avoiding any dualism between 'habit' and creativity" (Stengers 2017, xviii). Article 2 further elaborates on the concept of habit as a form of anticipation. In the article, I argued that meaning as habit of action is oriented towards the future (*esse in futuro*) rather than reducible to material parts, causal explanations, or actualised effects. In other words, I argued that it is possible to approach things as bundles of habits. Similar arguments have more recently been advanced, for example, by Antczak and

¹⁰ The most commonly cited legacy of Whitehead concerns his critique of the bifurcation of nature between the causal, objective nature and a free, subjectively perceived nature (Kouw and van Tuinen 2015). Whitehead's concept of bifurcation is often conflated with the concept of dualism, most commonly with Cartesian dualism. In his reading of Whitehead, Debaise (2017b, 6), however, makes a further distinction between bifurcation and dualism, and states that bifurcation denotes a more fundamental concept by which the emergence of dualisms like the Cartesian one can be analysed (c.f. Stengers 2011b). Bifurcation, then, is characteristic of the relationship between actual entities throughout the universe, but this relationship is not characterised by stability or structure, but by a dynamism, a becoming.

Beaudry (2019) under the conceptual framework of the ‘assemblage of practice’.

In steering away from the dualisms of correlationism, speculative realism adopts a very different understanding of relations and causality and states that a type of ‘*global dualism* saturates every corner of the universe’, not only the traditional relationship between subject and object (Harman 2010, 47, my emphasis). In the context of archaeology, I have characterised this philosophical move as the ‘pluralisation of interpretation’ (Article 3). This pluralisation, in turn, leads to the dissolution of the distinction between mechanical causality and contingent interpretation. In this context, interpretation is not thought of as a contingent operation between the real and the ideal but as a universal mode of relation. What the pluralised conception of interpretation then entails in terms of causality is a move from the atomistic view of causal relations as mechanistic and necessary towards regarding them as arbitrary and ambiguous, unfolding and unexpected. If relation should not be thought of as causal in the atomistic sense, the important question becomes how exactly do objects relate to each other? In order to answer this question, I will argue that a type of open-ended and anticipatory ‘aesthetic causation’ characterises interpretation as a pluralised mode of relation. In other words, aesthetic causation gives rise to withdrawnness and contingency, but it is also the chief operation behind the emergence of novelty. I will below discuss aesthetic causation in terms of interpretation, translation, and transduction, and I will later return to the topic of emergence.

After having formulated the principles of his speculative realism in *Tool-Being* (Harman 2002), namely the idea of the withdrawnness of objects, Harman has to extend his metaphysics to account for object interactions. The central question for Harman (2005) becomes how the objects that he envisioned as utterly isolated and vacuous can come to form relationships, change, and therefore also come to form objects that are more complex than their constituents. Harman’s answer is a take on phenomenology. Because traditional phenomenology in Harman’s view has been inherently anthropocentric, he aims to liberate phenomenology from its carnal constraints. In order to do so, Harman visions a novel form of causation that he comes to call ‘vicarious causation’. For Harman, vicarious causation alludes that

inanimate causation is trapped in the same puzzling middle ground as human perception itself—a no man’s land belonging neither to qualities nor to objects, but which is only *oriented* towards objects, even while inhabiting a mysterious plane of tangible elements. All vicarious causation unfolds in this elemental sphere, whose inner workings remain a riddle. (Harman 2005, 170, emphasis original)

In other words, Harman contends that the real object is mediated by the relational sensual object—which he calls vicar—while the real object remains withheld from these relations. In Harman’s OOO, an object is fourfold,

consisting of the withdrawn real object, the sensual object that is experienced as a distinct durational object, the object's real qualities that are necessary for the object to retain its identity, and the object's sensual qualities that are experienced at any given moment by other individual objects (Harman 2011). The question then becomes how an object can understand the inwardness of another object and its qualities if those are only indirectly represented by the sensual object and its sensual qualities? For Harman (2005; 2018a), the central operation that enables sensual objects to mediate real objects is metaphor. In this context, metaphor highlights that any attempt to understand an object's experience by recourse to literal description, exhaustive explanation, or other reductive strategies will only further alienate us from the experience of that object (c.f. Armogida 2018). Harman contends that in metaphor, for instance, "wine-dark sea", we assign to an object (sea) qualities (wine-dark) which are not normally associated with it in literalist treatments, and that this creative association results in new ways to orient towards the real object (sea). The real object, however, remains withdrawn and is replaced by the only real object that does not withdraw in the situation; the (in this case human) experiencer of the metaphor (Harman 2018a, 84).¹¹

A similar take on metaphorism is provided by Ian Bogost in his *Alien Phenomenology* (2012). Bogost states that the understanding of an object's perception of the world is only achieved by analogy. In reference to Thomas Nagel (1974) famous essay on bat phenomenology, Bogost argues that the way a bat navigates cannot be understood from the viewpoint of the bat itself but by analogy to, for instance, a submarine. In other words, metaphors function in ways similar to how models succeed in conveying something hidden about their objects. The heuristic power of the model, or the objective of devising models to begin with, is not based on close similarity between the model and the object, but instead relies on their differing from each other in some respect. In differing from its object, the model allows us to find out something new about the object. We then never understand two objects through their relationship, like the bat and a cave, or the submarine and the deep sea, but through our relationship to the relationship between those two objects (Bogost 2012, 78; c.f. Armogida 2018).¹² In this sense, metaphor connects to what was above discussed in terms of the intelligibility of historical meanings. Subject-object relationships are not intelligible unless they are examined against the triadic relationship between them and the world.

¹¹ This metaphorical view of orienting towards objects also turns understanding and interpretation into matters of what could be termed 'inter-material empathy'. Consider, for instance, how the concept of flow conveys how water—as an omnipresent hyperobject—feels (c.f. Strang 2014).

¹² See also Lucas (2015; 2019) who contends that metaphors are powerful in archaeology precisely due to their looseness and mobility.

Transduction

In a somewhat similar fashion, Timothy Morton (2012; 2013) refers to material interpretation, material translation, or material transformation of information as ‘transduction’. In transduction, information inherent to one thing is transduced (translated and transformed) into information pertinent to another. A signal perceived by a light sensor, for example, can be transformed into sound waves by a transducer loudspeaker.¹³ There is an important insight embedded in this characterisation of material relations as transductive. From the viewpoint of the light wave (the transduced) it makes no difference whether it is picked up or whether the information it carries is translated into sound waves by the loudspeaker (the transducer). The transduced remains unaffected by the act, while to the transducer everything looks like information (Morton 2013, 158).¹⁴ Morton (2013, 157–158) then points out that mechanical or ‘clunk causality’, as he terms it, is only one form of causality, while the common form is that of transduction. In light of transduction, information is not ideal but physical. Furthermore, perception is only one aspect of the transduction. As Harman, Bogost, and Morton teach us, transformation of information in this fashion is possible because perception is only oriented towards objects instead of exhausting their inner workings in interpretation:

Philosophy has perpetually thought causality to be at work ‘behind’ the scenes. Perhaps there is a deep existential reason why it does this. It does seem to parallel the long history what Heidegger calls the forgetting of being, the long march toward objectified lumps. But why? There is also an uncanny parallel with what in psychiatry is properly called the schizophrenic defense, in which the schizophrenic imagines all kinds of causal chains and threads to be at work behind his back. What this is blocking is how causality takes place ‘in front of’ things. This ‘in front of’ doesn’t mean spatially a few inches away from an objective thing, closer to our eyes. It means that causality is the way objects talk to one another, apprehend one another, comprehend one another: causality is the aesthetic dimension. Some forms of speculative realism imagine an abyss of dynamism churning beneath things. OOO, by contrast, imagines the abyss to be in front of things. When I reach for the coffee cup, I am reaching into an abyss. (Morton 2013, 66–67)

In thinking of the abyss as the locus of causation, the concept of transduction is even more important than Morton implies, and the concept

¹³ Also compare transduction to Gell’s (1998) abduction of agency, where objects acquire agency by abducting certain practical properties from humans.

¹⁴ Consider a further case of transduction: the musical record, for instance, cannot be experienced in any objective sense. Take any record player and it will repeat (‘represent’) the musical contents of that record differently. And even if one could predict the exact qualities of the sound experience, it would not undermine the fact that each and every component in the assemblage makes a difference, whether it is the stylus, the spinning wheel, or the inner wirings of the loudspeakers. Each component will result in a novel entity that is the musical experience in the ontological sense.

comes to form an important point of connection between speculative realism and process philosophies in terms of their conceptualisation of the nature of inference, as we will come to realise. In tracing the genealogy of the concept of transduction, we find it in the sociological philosophy of Henri Lefebvre. Much to the speculating archaeologist's delight, Lefebvre treats transduction not simply as characteristic of object-object relations, but as a method belonging to the realm of the absent and the possible. For Lefebvre (1996, 156), cultural absences in particular are the places of the possible and therefore give rise to speculative thinking in general. According to Lefebvre, we deal intellectually with these absences by the very method of transduction. Transduction, for Lefebvre, then, is

an intellectual operation which can be methodically carried out and which differs from classical induction, deduction, the construction of 'models', simulation as well as the simple statement of hypothesis. Transduction elaborates and constructs a theoretical object, a possible object from information related to reality and a problematic posed by this reality. Transduction assumes an incessant feed back between the conceptual framework used and empirical observations. Its theory (methodology), gives shape to certain spontaneous mental operations of the planner, the architect, the sociologist, the politician and the philosopher. It introduces rigour in invention and knowledge in utopia. (Lefebvre 1996, 151)

Lefebvre treats transduction as a counterpoint to the classical forms of inference, namely induction and deduction. Induction, as inference by enumeration and probability, generalises from a series of observations related through some type of iconicity or similarity while deduction, as inference by necessity, simply states the necessary consequences of a given set of arguments.¹⁵ Transduction, in contrast, speculates on the possible consequences of a given set of arguments: it is a model for development proceeding "from the (given) real to the possible" (Lefebvre 2002, 117–118, 195–196; Stanek 2011, 168). Transduction, as opposed to induction and deduction, is open-ended; it is the intellectual process of relating empirical observations to conceptual frameworks in a productive fashion. Lefebvre writes that "[transductions] go from the present to the virtual and from the given to the possible in a never-ending prospective operation which the usual psychological ideas of achievement, prediction and uncertainty cannot exhaust" (Lefebvre 2002, 118). Transduction, then, "is a history, a dialectical process of becoming" (Lefebvre 2002, 196).

Lefebvre makes good use of transduction as a heuristic method, but we can trace the history of the concept even further back in the history of philosophy.

¹⁵ Throughout the thesis, I refer to deduction in the narrow logical sense. Deduction denotes a logical schema, and I make no distinction between different forms of deductive inference in the sense that Hintikka (1998, 512–513), for example, distinguishes between definitory (the set of possible deductions) and strategic deduction (which deductions are good or bad). This leads me to state that any reference to deduction as inference to something other than logical necessity is a confusion between deduction and inductive or abductive inference.

Lefebvre's idea of transduction as a whole history of becoming echoes the sense in which Gilbert Simondon (1992), in his general philosophy of individuation, treats transduction as a central operation that governs the emergence of novelty (c.f. Stengers 2011a; Debaise 2017a).¹⁶ For Simondon, transduction is the force that 'dephases' parts of reality into existence. Transduction breaks a part out of its origin and gives it its own identity that enables us to consider it as separate from the whole.¹⁷ Transduction then "denotes a process—be it physical, biological, mental or social [...]. The transductive process is thus an individuation in progress" (Simondon 1992, 313). Most importantly, much like Lefebvre, Simondon takes transduction to challenge the established notions of induction and deduction by stating that they can provide at best a limited understanding of individuation. Simondon argues that classical forms of logic, namely induction and deduction, cannot be used to understand individuation; they can inform us of the results of the process of individuation, but not the actual process. What is noteworthy in Simondon's understanding of transduction, then, is that "it is at once a metaphysical and also a logical notion," however, "in no way restricted to the logical mind-set" because it does not terminate "in a conclusive proof" (Simondon 1992, 313–314). For Simondon (1992, 314), transduction rather denotes "the course taken by the mind on its journey of discovery".

The similarities between how transduction is understood in speculative realism and in process philosophy emphasise the points of connection between these philosophies. By the same token, the concept also connects these philosophies to pragmatism. As both an ontogenic and a psychic process, Simondon's transduction shares a special affinity with Charles Peirce's concept of abduction. Differing significantly from both induction and deduction, abduction, like transduction, is the only kind of logical operation that can introduce new ideas (CP 2.96).¹⁸ Furthermore, Simondon would seem to share the Peircean view that logic is not restricted to formal or sentential argumentation (c.f. Part Three). In arguing that transduction is an intuition, Simondon is very explicit that there is an intuitive aspect to logic:

Transduction [...] is not only a path taken by the mind, it is also an intuition, since it allows a structure to appear in a domain of problematics yielding a solution to the problem at hand. In the sense

¹⁶ Simondon was most likely inspired by Schelling's philosophy of nature as well as Whitehead that were both included in Merleau-Ponty's lectures while Simondon was writing his dissertation under Merleau-Ponty's supervision (Austin 2011, 9). See also Bergson (1944) for a vitalist theory of individuation.

¹⁷ See also Deleuze and Guattari (1987, 60) who use the term in a fashion similar to Simondon's. Or consider Peirce's (EP 1, 353) idea of love as the ultimate force of creation and harmony in the cosmos: "The movement of love is circular, at one and the same impulse projecting creations into independency and drawing them into harmony."

¹⁸ Interestingly, in addition to the obvious connection to Peirce, Simondon's idea of transduction as the logic of discovery connects with Norwood Russell Hanson's (1958) ideas of abduction as the logic of discovery or Gilbert Harman's (1965) understanding of Inference to the Best Explanation (Article 3; Part Three).

contrary to deduction, however, transduction does not seek elsewhere a principle to resolve the problem at hand. (Simondon 1992, 314–315)

One central connection between the use of transduction in European process philosophy and abduction in Peirce's semiotic philosophy is the very notion of process that Peirce too uses to describe inference (Articles 1–3; Marila 2011; see also Part Three). At the heart of Peirce's epistemology is a deep ontological commitment that all of the cosmos takes place as a form of pluralised interpretation, a process Peirce refers to as 'semiosis':

All dynamical action, or action of brute force, physical or psychical, either takes place between two subjects (whether they react equally upon each other, or one is agent and the other patient, entirely or partially) or at any rate is a resultant of such actions between pairs. But by 'semiosis' I mean, on the contrary, an action, or influence, which is, or involves, a coöperation of three subjects, such as a sign, its object, and its interpretant, this tri-relative influence not being in any way resolvable into actions between pairs. (EP 2, 411)

Whereas dynamical action denotes a kind of brute actuality or relationality between two agents (compare with Morton's clunk causality above), by semiosis, Peirce is referring to an increased sense of dynamism between more than two subjects. Remember that, in Peirce's semiotics, semiosis is an interpretative process. The smallest unit of signification in this process of interpretation is the dynamic and tri-relative sign. The sign, then, consists of three elements; (1) the *object* of the sign (that which is being represented), (2) the *representamen* (that part of the sign which stands for the object in some capacity), and (3) the *interpretant* (the intellectual effect of an instance of interpretation). Consequently, semiosis, is not the simple physical act of connecting an object with a representation, but instead the process in which an object is mediated by a sign interpreted by a conscious subject. Importantly, in this process, the resulting interpretation becomes a further developed sign of the same object (CP 2.228). As pertains to our earlier discussion about transduction as a form of translation and transformation, the interpretant in Peirce's model of the sign can be understood as a form of translation that provides a more complex understanding of the object of the sign (Liszka 1996). David Savan (1988, 41) has even proposed that the interpretant should be called the 'translatant'.¹⁹ Furthermore, interpretation, for Peirce, is not restricted to a thinking interpreter, but semiosis takes place in animals, plants, and crystals, an aspect that was also central to Simondon's philosophy of individuation.²⁰

¹⁹ In this sense, Peircean semiosis, coupled with Simondon's transduction, provides a way to balance between representation and translation. This could have great applicability, for instance, in thinking of the faithfulness of archaeological methods in representing the past versus their creative capacity to produce it.

²⁰ See Simondon (1992) for a discussion on transduction in crystals. Furthermore, consider, for example, how nonhuman lifeforms interpret an archaeological site and how they are therefore partial to

Peirce's understanding of the process of interpretation can therefore be seen simultaneously as ontological and logical, and universal and infinite. In elaborating on the unfinished nature of interpretation, Peirce differentiates between two meanings of the object of interpretation, the 'immediate object' and the 'dynamical object':

We must distinguish between the Immediate Object,—i.e., the Object as represented in the Sign,—and the Real (no, because perhaps the Object is altogether fictive, I must choose a different term; therefore:), say rather the Dynamical Object, which, from the nature of things, the Sign *cannot* express, which it can only *indicate* and leave the interpreter to find out by *collateral experience*. (EP 2, 498, emphases original)

This distinction is important for understanding semiosis as both sign action and speculative inquiry. The immediate object can be conceptualised as the object as it is mediated or represented by the representamen and interpreted by an 'interpreting thought' (CP 1.480). The dynamical object on the other hand denotes an object that, while it is represented, nevertheless fails in determining an interpretant. In this sense the real object remains withdrawn from relations to a certain degree. Peirce clarifies this in another context:

The object is something external to and independent of the sign which determines in the sign an element corresponding to itself; so that we have to distinguish the quasi-real object [i.e. dynamical object] from the presented object [i.e. immediate object]; or as we may say, the external from the internal object. And the external object as it is in itself is to be distinguished from the feature of the external object that is represented. (MS [R] 145)²¹

By the same token, if a sign is not interpreted and fails to transform into a more developed sign, it fails to be a sign in general. This would not only bring the infinite interpretive process to a halt but it would also collapse the whole chain of semiosis. Because semiosis, and therefore also inquiry, is infinite, the dynamical object is never actualised or represented.

The question then becomes how can a sign represent an object that does not exist? Because the dynamical object is a key component in Peirce's inquiry as semiosis, it is not enough to state that all signs must have a dynamical object, but also to make the reservation that some dynamical objects are fictional or unreal (see, again, above quote; c.f. Bergman 2009; Bellucci 2015; Wilson 2017). Furthermore, Peirce would similarly seem to support the idea that, while the fictional objects themselves do not directly have real causal effects, the possibility of their existence may incite an interpreter to act in such

how the site unfolds as an entity emergent of its constituents (Farstadvoll 2018; Tuominen and Marila 2020).

²¹ Compare Peirce's dynamical object (or quasi-real object) with Harman's real object and, correspondingly, Peirce's immediate object (or presented object) with Harman's sensual object (e.g. Harman 2018a, 80). Another connection could be drawn between what Harman calls the real qualities and the sensual qualities of an object and Peirce's representamen and interpretant, respectively.

a fashion as to have real causal effects (c.f. EP 2, 497n).²² The sign cannot express but only indicate the potential existence of a dynamical object, leaving the interpreter to infer this from the aforementioned ‘collateral experience’ (i.e. the relationship between the sign and the immediate but unreal object?). This means that, rather than understand interpretation as explanation to the causes of a particular real object, all interpretation and inference should be understood as a form of anticipation (i.e. speculation). This is similarly true for indexical, iconic, and symbolic signs. Symbols (e.g. names) and icons (e.g. images) can represent fictitious objects, and in the case of indices (i.e. sign and object connected by physical necessity) the physical connection between the sign and the object—and, by this token, the reality of the object—only has to be anticipated or ‘prehended’, it does not have to be real in the narrow materialist or objectivist sense of the term (cf. Debaïse 2017b; c.f. Wilson 2017, 542–543).²³ Furthermore, keeping in mind Peirce’s conviction that interpretation is a habit in and of the world, the speculative nature of inference permeates all existence, not only human cognition. A horse only has to interpret movement in the bushes as an indexical sign of danger, the danger does not have to be real. In this sense, purely indexical signs and relations (connection by physical force) constitute only one aspect of causality, whereas the common form is aesthetic and anticipatory in nature. I will return to the connection between aesthetics and anticipation in Part Four.

6. Emergence of novelty

The main objective of this part is to show that aesthetics rather than mechanics is the common form of causation, and that therefore also the common form of interpretation is aesthetic rather than explanatory. The most profound implications of the aesthetic view of causation for the epistemology of archaeology is that the application of particular archaeological theories or methods never succeed in giving a full account of the object of study (Articles 1–3, and 5).²⁴ A particular theory or possible explanation for the perceived qualities of the object is precisely a particularistic description of that object

²² Compare Peirce’s fictitious object with Harman’s metaphor, the operation of replacing the sensual object (object of the metaphor) with a real object that is the experiencer of the metaphor (Harman 2018a, 84).

²³ This does not mean that the object (or signified in semiological terms) could not be real (in the OOO sense): “signs do have an ultimate signified whose nature is precisely not to become present” (Harman 2018a, 206).

²⁴ Rather than denoting the representational ‘reality for us’, or pertaining simply to beauty, art, or bodily forms of experience, the term ‘aesthetic’ in this context is used as a metaphysical and speculative concept; a cosmological tendency of existence and relation. Harman provides a good description: “If we now say that the universe has an aesthetic or metaphorical structure, this has nothing to do with the shopworn theme of a conscious human artist projecting values onto an arbitrary perspectival universe. Instead, it is an actual metaphysical statement about the way that raindrops or sandstorms interact among themselves even when no humans are on the scene. The point is not the old postmodern chestnut of ‘life as literature,’ but rather causation itself as music, sculpture, and street theater. When we speak of beauty, charm, humor, metaphor, or seduction, these are no longer perspectivist and humanized terms employed to flog naive realism, but are instead the basis for a haunting new realism more compellingly naive than any that has come before.” (Harman 2005, 174)

rather than an explanation as to the process by which those qualities emerged (c.f. Hodder and Hutson 2003, 191–193). Future theories and explanations are similarly valuable in providing their unique view of the object. Or better yet, theories are similarly inexhaustible objects in the sense that they too change accordingly; they too will ultimately fail to represent their objects (Pétursdóttir and Olsen 2018).

Along with the uses of Harmanian object-oriented ontology, the type of process philosophy attributable to Whitehead, Peirce, or Deleuze and Guattari has been instrumental in conceptualising the role of process in archaeological reasoning after the speculative turn (Normark 2006; 2010; Witmore 2012; Harris 2014; 2017; Fowler and Harris 2015; Gosden and Malafouris 2015; Fowler 2017; Hamilakis and Jones 2017; Cipolla 2018; Article 3. See also Immonen 2010; Harris 2018; Jensen 2018 for reviews of uses of Deleuze in archaeology and cultural theory). In his exposition of the tension between the realities and constructs of archaeology, Chris Witmore (2012) makes use of Whitehead's speculative philosophy. For Witmore, archaeology's tendency to treat the archaeological materials as substances predating the present and archaeological knowledge as abstractions of that past is based on the bifurcation between causation and interpretation. In general terms, this bifurcation can be held as responsible for creating the great divide between the past and the present, or archaeological materials and archaeological abstractions. Witmore then argues that archaeological abstractions only succeed in transforming rather than representing the past. Archaeology, for Witmore, becomes 'pragmatology', a pragmatic attitude 'towards' the past as a continually evolving and unfolding reality, and the way to practice archaeology is to orient oneself towards the objects. This 'orienting towards the past', then, as a method of transformative co-creation rather than abstraction from the factual, is motivated by the idea that things hold in reserve an immense and inexhaustible capacity for novel interpretations and perceptions of them (Witmore 2012, 27, 33; c.f. Witmore 2013; 2015; see also Rutherford 2016; Ståhl et al. 2017).

Following this, any method by which we can study those objects provides only one particular viewpoint to the object (Shanks 2014; Witmore 2014). Drawings, maps, photographs, or 3D models are forms of translation, and the result of this translation is not a faithful representation of the object, but an altogether novel entity; a co-emergence determined partly by the chosen method and the phenomenon being researched or 'represented' (Witmore 2004b; 2012; 2015; Edgeworth 2012; 2016; Ståhl et al. 2017). And yet, this is only the techno-scientific extent of the process of this translation. In the course of its existence, the object has taken part in multiple relations ranging from its manufacture and the multiple uses it may have had in the past to its discard, and from the geochemical processes in which it has partaken to its eventual finding by the archaeologist. Neither of these processes has exhausted the object in terms of what the object is made of or what it can be used for. These multiple relations that the object has shared and, more importantly, can possibly share in the future constitute the many meanings of the object (Article

2, pp. 17–18), with the reservation that the object is not exhausted by any collection of actualised or possible practical effects or meanings.

In elaborating on the character of the aesthetic mode of experience in objects and organisms, James Gibson (1979) has coined the term ‘affordance’. In Gibson’s affordance theory, entities perceive their surroundings as possibilities for action rather than as collections of distinctive objects. An important aspect in Gibson’s theory then is that the affordance provides a way of negotiating between surroundings as objective and experience as subjective. What becomes out of the newly found relationship is the realisation that organisms experience their surroundings aesthetically as a mode of hybrid becoming or an anticipated creation, rather than through the act of iteration:

An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer. (Gibson 1979, 129)

Because Gibson’s theory has its origin in ecology, it can intuitively be applied in the realm of sentient beings. However, his consolidation between objectivity and subjectivity also finds appreciation in conceptualising inanimate relations as aesthetic (Witmore 2012; Edgeworth 2016). Following Gibson’s ideas, a number of archaeology’s theorists have made the case for a pluralised aesthetics in the sense that all entities perceive their surroundings as affordances; all entities experience their surroundings in terms of an anticipation of what it can become, rather than as a collection of discrete objects (c.f. Olsen et al. 2012; Witmore 2012; 2014; Graves-Brown 2013; Pétursdóttir and Olsen 2014; Shanks 2014; Edgeworth 2016; Cipolla 2018). Furthermore, this kind of perception is not determined by a cataloguing of the constituents of the perceptive experience, but instead takes place as a type of transformative performance or ‘aesthetic translation’ (see also Article 3).

This conceptualisation of translation is not only pertinent for object-object relations, but also for the process by which archaeological discovery becomes an act of past creation: as already noted, archaeologists routinely create that which is thought to have existed prior to its discovery (Hodder 1997; Buchli and Lucas 2011, 16–17; Edgeworth 2012). However, the act of creation can simultaneously be an act of destruction. Consider, for example, the archaeological excavation (c.f. Lucas 2001). Features are emergent results of a special type of process in which they are simultaneously created and destroyed:

Features such as ditches, pits, postholes, animal burrows, palaeo-channels, traces of ice crevices, other periglacial features and so on are rarely encountered in their entirety all at once. They do not suddenly appear in fully fledged being like potsherds or arrowheads do. Their surfaces are open rather than closed, and have to be disentangled from the convoluted stratigraphic sequences in which they are embedded.

Their edges are often indistinct and fuzzy. They may comprise numerous component parts, imperfectly fused or separated in space. They are inherently incomplete, sometimes being cut or truncated by other features. Their partial and open-ended outline is defined by soil boundaries which disappear out of sight to be followed along with the tip of the trowel, the continuations hidden by occluding layers of soil which must be dug out with mattock and spade. They split into divergent objects or merge into composite ones, or get partially covered over or removed. These emergent/receding and merging/fragmenting entities can be followed or tracked, but rarely can they be apprehended all at once in a single instant. At any moment only part of the feature is visible, and by the time the last of it is found most of the rest of it has been destroyed. (Edgeworth 2016, 99)²⁵

This understanding of causation raises a particular question regarding the nature of causation by asking where exactly does the type of novelty that calls for our attention and explanation come from in the first place? The philosophical doctrine known as ‘emergentism’ states that entities are irreducible to their fundamental or prior constituents, and, consequently, that their emergence or properties cannot be explained by the existence or properties of their constituents (DeLanda 2011; Witmore 2017). Famous examples include the emergence of organic life from inanimate life, and the emergence of consciousness from simpler forms of organic life (c.f. Deacon 2013). In neither of these cases can the emergent properties be explained by the existence of simpler elements or any prior law by which that emergence took place.

A similarly famous archaeological example is the spread of farming in Europe. The emergence of agriculture cannot be explained by the prior existence of the elements of the Neolithic. Neither was the emergence of agriculture governed by any prior or superior natural or cultural law. Instead, Neolithisation took place as gradual coevolution whereby the elements became entangled and transformed in the process (Hodder 2012; Robb 2013). The beginning of this coevolution is impossible to pinpoint and, while it is possible to detect subsistence consisting of full-blown farming, the developmental stages that led to farming often have to be inferred from vague and suggestive rather than conclusive evidence (e.g. Vanhanen et al. 2019). Consequently, Neolithisation cannot be broken down to prior or more elemental components or simple explanations. As John Robb sums his research on the topic,

[a]fter a century of research, there is still no widely accepted explanation for the spread of farming in Europe. Top-down explanations stress climate change, population increase, or geographic diffusion, but they distort human action reductionistically. Bottom-up

²⁵ Another interesting example is given by Mats P. Malmer. In explaining the emergence of a new type in the evolution of an archaeological artefact, Malmer writes that “[w]e can define the concept ‘genesis of a new type’ by saying that it is a point in a typological series at which the points of similarity between the groups arranged in time sequence are few, possibly so few that we are not certain whether there is continuity or no” (Malmer 1963, 265–266. See also Van Oyen 2015).

explanations stress the local, meaningful choices involved in becoming a farmer, but they do not account for why the Neolithic transition in Europe was so widespread and generally unidirectional. The real problem is theoretical; we need to consider the transformative effects of human-material culture relationships and to relate humans, things, and environments at multiple scales. (Robb 2013, 657)

Emergentism's view of causation, then, resists top-down or bottom-up theories, and in fact states that even together they will fail in providing satisfactory explanations for the process of emergence. As suggested by Robb, the problem is theoretical, but whether speculative philosophy can provide satisfactory answers to this problem remains unclear. While influential in archaeology, Harman's object-oriented solution, for instance, has been criticised of falling short of providing a satisfactory account of the details of the process by which novel, especially social, objects emerge (Edgeworth 2016; Article 2, but see Harman 2016). Harman's account for the process of emergence states that the objects that are created in this process are simply result of objects coming into unexpected or unforeseen relations, forming a larger, more complicated object in the process. The responsibility of science, then, Harman contends, is exactly to resist the temptation to reduce this process to material constituent or theories of meaning (2013; 2016; c.f. Campbell et al. 2019).

Harman elaborates his argument with a distinction between three forms of intellectual reduction of emergence: undermining, overmining, and duomining (Harman 2011; 2013). Undermining is the conviction that common objects are composed of something more elementary, while overmining states that there is nothing hiding beneath relations, observed effects, or appearance. Physicalism and atomism are good examples of undermining, while idealism and social constructionism fall in the latter category. Duomining on the other hand is the position that simultaneously makes use of both positions. Modern science, in Harman's (2013) treatment, is a duomining project because it simultaneously states that things can be broken into their elementary constituents and are knowable through mathematisation. Harman contends that OOO succeeds in avoiding this duomining position because it holds that objects are always more than their pieces and less than their effects (Harman 2016; 2018a, 53). Interestingly, then, by describing his solution to the problem of under-, over-, and duomining, Harman simultaneously comes to propose a new solution to the problem of the two cultures (see also Article 1). In accusing the natural sciences for adopting an undermining strategy, and the humanities for mainly espousing overmining, Harman argues that, because speculative realism makes no exhaustive mining claims, it is the real third culture that transcends the gap between the sciences and the humanities (Harman 2012a).

7. Speculation

If the task of speculative philosophy is to escape the correlationist circle, its first duty is to negotiate the tension between the empirical and the conceptual.²⁶ Harman's answer was to resist the conceptualisation of either top-down or bottom-up descriptions as exhaustive and remain open-ended to the possible creations that the cosmos is capable of. For the relevance of the epistemology of archaeology, the notion of open-endedness highlights the problematic relationship between expectation and discovery. Peirce's answer to what could here be termed the problem of discovery was to conceptualise abduction as a main component in the process of discovery: abduction mediates between expectation and discovery by suggesting not probable but possible experiences. Abductive inference, then, is the only logical operation that can equip us with the needed preparedness to the unexpected and ambiguous ways in which novel things emerge and unfold in our experience. In many ways, then, when elaborating on the relationship between metaphysics and epistemology, the abductive extent of Peircean inference can be seen in connection to not only the ontological concept of transduction, but also to the sense in which Whitehead connects metaphysical concerns to those of epistemology in his quasi-rationalist speculative philosophy (c.f. Parisi 2012; Savransky 2017).

One concept through which Whitehead explores the structure of his speculative philosophy is proposition. "Unfortunately", Whitehead writes, "theories, under their name of 'propositions,' have been handed over to logicians, who have countenanced the doctrine that their one function is to be judged as to their truth or falsehood", while in actuality, such judgement is "a very rare component" (Whitehead 1978, 184). Whitehead then wishes to conceptualise proposition as more than food for judgement. The principal sense in which Whitehead (1978, 184) refers to the speculative nature of propositions beyond judgement is its function as a 'lure for feeling'.²⁷ This alternative function of propositions for Whitehead is to intensify and make experience important. Importance, importantly, does not entail the identification of facts, but of possibility:

²⁶ There is a tension between experience and discovery, habit and creation, and empiricism and rationalism. The task of speculative philosophy is to seek a relation between rationalism and empiricism. Worth mentioning in this context is the 'radical empiricism' of William James. If rationalism treats relation as an ontological necessity, and if empiricism sees relation as a fabrication of the experiencing mind, James radical empiricism states that "[t]o be radical, an empiricism must neither admit into its constructions any element that is not directly experienced, nor exclude from them any element that is directly experienced. For such a philosophy, the relations that connect experiences must themselves be experienced relations, and any kind of relation experienced must be accounted as 'real' as anything else in the system" (James 1912, 42). For James, then, experience becomes the criterion of reality, but there is no correspondence between the two (c.f. Parisi 2012; Witmore 2015). "In other words, universality can be ascribed neither to the knowing subjects *nor to the objects known*" (Savransky 2012, 353, emphasis original).

²⁷ In this sense, proposition is "a new kind of entity", or "a hybrid between potentialities and actualities" (Whitehead 1978, 185–186).

importance can never be reduced to a de facto or given situation: it implies attachment to something in a disappearing world, dwelling on possible becomings, pressing for, insisting on, all those ‘might haves’ or ‘could bes’ implicit in situations. Making a situation, past or present, be of importance, means intensifying the sense of possibles it harbours, as expressed by the struggles and claims to another way of making it exist. (Debaise and Stengers 2017, 17)²⁸

In this sense, by aiming to intensify the multiplicity of possible experience rather than the singularity of factuality, proposition has a function beyond proof, but also cognition and logic in general. The intensification of importance contributes to the intensification of experience prior to any categorising consciousness (Debaise 2017b, 80). Whitehead contends that “a feeling does not in itself involve consciousness” (Whitehead 1978, 256), and that the way subjects feel the effects of the proposition are subject to the “differences in the histories of the origination of those feelings in their respective subjects” (Whitehead 1978, 263). In this sense the subjective forms of feeling are dominated by valuation rather than consciousness (Whitehead 1978, 263).²⁹ Whitehead continues:

The subjective form lies in the twilight zone between pure physical feeling and the clear consciousness which apprehends the contrast between physical feeling and imagined possibility. A propositional feeling is a lure to creative emergence in the transcendent future. When it is functioning as a lure, the propositional feeling about the logical subjects of the proposition may in some subsequent phase promote decision involving intensification of some physical feeling of those subjects in the nexus. Thus, according to the various categoreal conditions, propositions intensify, attenuate, inhibit, or transmute, without necessarily entering into clear consciousness, or encountering judgement. It follows that in the pursuit of truth even physical feelings must be criticised, since their evidence is not final apart from an analysis of their origination. This conclusion merely confirms what is a commonplace in all scientific investigation, that we can never start from dogmatic certainty. (Whitehead 1978, 263–264)

Whitehead’s philosophy, then, adopts the deep ontological conviction that subjective speculation is as much partial to the creation of experience (reality) as are those subjectivities which are object to the perception of that particular speculating subject. This tension between subjectivities rather than object and subject is what I refer to when I say that (exact) methods of representation too

²⁸ Speculative philosophy’s way of relating to things grants “due importance to the deeply plural experience of nature” while aiming to intensify “experience to its maximal point” (Debaise 2017b, 77). In this sense a speculative philosophy is not simply a speculative metaphysics, but an empirically sensitive pragmatic philosophy (Debaise 2017a).

²⁹ Whitehead’s understanding of the directionality and relation between perception and consciousness echoes Peirce’s view of the process by which “abductive inference shades into perceptual judgment without any sharp line of demarcation between them; or, in other words, our first premisses, the perceptual judgments, are to be regarded as an extreme case of abductive inferences, from which they differ in being absolutely beyond criticism” (CP 5.181; see also Article 3).

contain a speculative element and that they too are creative rather than impartial in the ontological sense (Articles 3–5; Part Four). There is therefore an important ontological aspect to how Whitehead sees creativity as the absolute force in the cosmos rather than a layer added onto it (Whitehead 1956; c.f. Latour 1999). The task of philosophy, like any science, then, is to explain how this creation takes place and how more complex and abstract entities can emerge from simpler forms of life (Whitehead 1978, 20). To begin with, the speculating scientist will need a method by which this task can be undertaken, a method that places equal weight on the empirical and the rational:

The true method of discovery is like the flight of an aeroplane. It starts from the ground of particular observation; it makes a flight in the thin air of imaginative generalization; and it again lands for renewed observation rendered acute by rational interpretation. [...] [Imaginative] thought supplies the differences which the direct observation lacks. (Whitehead 1978, 5)

In this way, Whitehead's understanding of speculation as a source for empirical sensitivity highlights the interrelatedness of speculative thinking and empirical observation. The purpose of speculative thinking is to intensify the sensitivity of observation to its maximal point lest we get stuck in the groove of experiencing habitually.

...

I have in this part explored the different understandings of this emergent process in reference to the tension between mechanistic and aesthetic causality. The common nominator for aesthetic forms of understanding is their abstract nature. We saw this with theories of transduction and abduction as well as with the metaphorism of alien phenomenology. These all endorse the view that translation, abstraction, vagueness, and metaphorical description rather than literal explanation of concreteness by causal necessity characterise understanding. In speculative philosophy, then, the aesthetic becomes

the most fundamental characteristic of nature, rather than a supplementary added onto it. The aesthetic becomes the site of all ontology; it is the plurality of manners of being, manners of doing, capacities to be affected, in a word, the modes of 'feeling' that are at the center of a theory of the subjects of nature. (Debaise 2017b, 58)

The important task of speculation as an empirically sensitive philosophy, or as an explicitly 'speculative empiricism', then, is towards those alternative modes of feeling, experience, and existence that it is capable of entertaining and creating (Debaise 2017a). Speculation does not simply imply that the past could have unfolded differently. As an empathic method, speculation denotes

a deeper intimacy with the experiences of the past subject as well. Like today, events in the past involved decision-making, hesitation, and insecurity. Speculation empathetically links us with the insecurities and hesitations felt by the subject in the course of the past event as it unfolded as a nexus of possibilities. The lure function of speculation is not simply intended to open this moment to the possibility that future experiences might be different from past feelings, but to intensify our feelings by linking them with the diversity of those felt in the past (Debaise 2017b). The decisions of past individuals are important to feel because they, just like our own decisions, are “related to the constitution of the actual world”, but also to the ways in which possibilities “continue to have a latent presence” (Debaise 2017b, 86).

PART THREE—THE EMPIRICAL COMPONENT

A decapitated frog almost reasons. The habit that is in his cerebellum serves as a major premiss. The excitation of a drop of acid is his minor premiss. And his conclusion is the act of wiping it away. All that is of any value in the operation of ratiocination is there, except only one thing. What he lacks is the power of preparatory meditation. (CP 6.286)

8. Archaeological inference

It was argued in the previous part that the speculative turn introduces metaphysical concerns that an empirically sensitive epistemology of archaeology cannot sidestep. A case was then made for an emergentist understanding of causation, and it was argued that aesthetics rather than necessity or mechanics is the ontological foundation of causation, and therefore interpretation and inference as well. The understanding of metaphysics as inherently a matter of aesthetics has specific implications for the epistemology of archaeology. First of all, inference cannot be thought of as a matter of causal explanation, but rather as a matter of aesthetic orientation. Secondly, because aesthetics takes centre stage, what is referred to as explanation is actually a form of anticipation. Thirdly, because the processes relevant for controlling the anticipations are underdetermined and contingent, the corresponding explanations remain highly uncertain and suggestive as opposed to reliable and conclusive.

The tension between causality and aesthetics, explanation and description, or reliability and uncertainty are characteristic of the theoretical and methodological anxieties of archaeology throughout its existence. In archaeology, this tension has since the latter half of the 19th century manifested itself in the form of a troubled relationship between the natural sciences and the humanities in particular. As consequence, archaeology is marked by shifts in what is considered the proper or most reliable method of archaeological inference. These idealisations have, to a certain extent, tended to follow wider theoretical and methodological currents in archaeology's neighbouring disciplines, such as history, literary criticism, or metaphysics for archaeological theorising, and analytical philosophy, evolutionary biology, or particle physics for archaeological science (Bapty and Yates 1990; Pluciennik 2011; Kristiansen 2014; Martínón-Torres and Killick 2014; Lucas 2015; Pétursdóttir and Olsen 2018).

All of the research articles presented in this thesis provide takes on the history of archaeology in light of the epistemological opposition between the sciences and the humanities, but more importantly between the preferred mode of inference in archaeology. Special attention should be paid to Article 4

that aims to negotiate between two different ways of understanding the nature of knowledge formation in archaeology. The article contextualises the emergence of New Archaeology in contrast to the so-called traditional archaeology. It was argued in the article that one of the special characteristics of New Archaeology is its dependence on the concept of deduction, while traditional archaeology has favoured the concept of induction. The philosophical underpinnings of both traditional archaeology and New Archaeology were to some extent also rehearsed in Part One. However, insofar as the traditional archaeology can be seen as chiefly inductive and the New Archaeology as primarily deductive, these concepts deserve further attention. Large parts of this part will therefore be dedicated to reiterating the history of archaeology from the perspective of induction and deduction. However, in aiming to follow the ontological considerations presented in Part Two, this part aims to highlight attempts in the epistemology of archaeology to sidestep the inductive/deductive dichotomy altogether. To this end, the part argues that the logical form of speculation is best described as abductive. In this respect, the part discusses the nature of ampliative inference from the viewpoint of abductive inference as well as Inference to the Best Explanation. The last chapter of the part is devoted to forming a typology of archaeological inference.

9. Induction

In many ways, Scandinavia was the epicentre of archaeology's methodological innovation between early 19th and mid-20th centuries. The majority of the discussion, however, dealt with the construction of archaeological chronologies and the explanation of cultural change through concepts of migration and diffusion, rather than the nature of archaeological inference (Article 4; Pohjola et al. 2019, 26–36). Although discussions over the archaeological method formed an important part of archaeological literature at that time, conceptualising the nature of archaeological inference through the concepts of induction and deduction remained sporadic. It should also be noted that in early Scandinavian archaeology the concepts were used as loose descriptions of the inferential process rather than introduced as logical schemas to follow. For this reason, other concepts, namely stylistic evolution and culture-historical idealism rather than logical structures should be seen as the two superstructures that guide interpretation in the so-called traditional archaeology.

Early reference to the distinction between induction and deduction can be found in Sophus Müller's (1884; 1897, 689–702) writings on the nature of archaeological inference. Although Müller engages in an explicitly epistemological discourse, his writings have remained relatively little studied in the philosophy of archaeology. An in-depth analysis of Müller's (1884) philosophy of archaeology has been conducted by Finnish archaeologist Eero Muurimäki (2000, 137–156), so its broader exposition is not necessary.

Certain aspects in Müller's writings are, however, useful for our purposes. Most importantly, Müller is explicit in his distinction between two types of inference when he argues that the nature of archaeological inference is inductive rather than deductive.

The task of induction in Müller's view is to establish generality in observation, but Müller also highlights that the nature of this generality—in terms of its power in explaining cultural change and variety—is local rather than universal. This emphasis on locality is evident in Müller's insistence that prehistoric chronology for instance can never be establishment through evolutionary stylistic analysis, as was argued by his Swedish colleague, Oscar Montelius (Article 4). For Montelius, Darwinian evolution was the guiding principle behind stylistic analysis. Montelius went so far as to propose that the simple description and comparison of archaeological materials should no longer be the task of archaeology, but instead archaeology should seek to trace the internal connections between styles, and the development of one style from another, by following the laws of evolution (Montelius 1884; 1899).

Müller (1884), then, was critical of the use of evolutionary theory as a starting point or as an explanatory model in constructing prehistoric chronologies stylistically. Müller held that evolutionary typology would lead to a situation where the evidence is used to verify the law that was supposed to explain the observed peculiarities in the evidence in the first place. In contrast, Müller argued that the analysis always depends on knowledge of or is affected by preconceived ideas regarding the find circumstances, or other knowledge of the subject matter (c.f. Gräslund 1987, 88).

In his reply to Müller's critique, Montelius (1884) insisted that his artefact analysis always proceeds in conjunction with the analysis of circumstantial evidence. Nevertheless, or, as argued by Bo Gräslund (1987, 89), perhaps for this very reason, Montelius had a hard time in separating the cause and effect in his chronology. Interestingly, Müller notes that, while the concept of law-likeness in causality is central in archaeology, it can only be thought of in terms of special laws regarding the locality of the material itself rather than general laws regarding their establishment. Müller then contends that, while causal explanations may be interesting to certain speculatively oriented minds in the far future, they have no place in archaeology (Müller 1897, 695).

The tactics by which Müller himself seeks to reconcile between cause and effect, or deduction and induction, is to emphasise the role of hypotheses as part of the inferential process. Because, in the ontological sense, Müller (1884, 188) upholds the idea of free will, and therefore also of the contingency of human action, the hypotheses regarding causes behind cultural change should always be taken as contingent rather than explanatory (Article 4). Müller uses the concept of hypothesis in a very special sense that makes it a distinctive type of reasoning in addition to deduction and induction. Induction, for Müller, denotes the establishment of local and temporal specificity, such as the regional identification of a Neolithic culture group through the observation of similarities in the material culture, whereas deduction is the simple operation of determining that a new find belongs to a group of similar finds (Müller 1884,

191). Hypothesis on the other hand has a specific meaning for Müller, who treats it as an instance of analogical thinking.³⁰ In Müller's view, hypothesis provides an answer to a question by borrowing an idea from one context, such as modern ethnography, and applies that information in the archaeological context under study. The function of a stone axe, for example, has been possible to determine through modern analogy. For Müller, then, the primary method by which perplexing observations are made sense of in archaeology is the comparative method that proceeds from the known to the unknown through analogy.

On the other hand, Müller writes that the most common form of archaeological inference is induction—the establishment of generality through simple observation—and that hypothesis only expands the specificity of those observations. Because, for Müller, both induction and hypothesis have their roots in the observation of archaeological materials, it remains unclear exactly to what extent he considers them as separate operations (c.f. Muurimäki 2000, 150–156). By the very same token, because Müller considers the observation of modern materials similarly as a possible source of archaeological knowledge, it remains contestable whether Müller succeeds in avoiding the tactics he charged Montelius with, and whether Müller himself can avoid the confusion between cause and effect, or discovery and creation. Nevertheless, it is clear that both Montelius and Müller aim to emphasise the role of the archaeological material and their observation as primary sources of archaeological knowledge. Both Müller and Montelius support the idea that through careful collecting the amount of archaeological knowledge will increase and the amount of archaeological speculation decrease.

This conception is also widespread in Finnish archaeology that has, in the historical sense, tended to focus on collecting with less emphasis on the role of theorising (Article 4). Those early (pre-1970s) Finnish texts that can be seen as theoretical do not so much address the epistemology of archaeology, but are better characterised as metaphysical. Overt systematisation, for instance, is criticised by recourse to what appears to the reader as a form of objective idealism and the emphasising of human free will (e.g. Nordman 1915; Tallgren 1934).

Accordingly, explicitly epistemological references to induction and deduction are rare in early Finnish archaeological literature. One example can be found in a conference talk given in 1923 by Finnish archaeologist Julius Ailio. In his talk, Ailio, who can be grouped in the natural scientist camp of Finnish archaeologists, iterates the objectives and methods of archaeology (see also Article 4). In many ways, the talk, in which Ailio (1923) describes the task of prehistoric museums, is characteristic of the archaeology of his time. First of all, following the nationalist agenda, Ailio writes that the primary responsibility of archaeology and museum work is the collection and

³⁰ Note also that, in some writings, Peirce refers to abduction as 'hypothesis', but also note that he sometimes differentiates between abduction and analogy as distinct forms of inference (e.g. EP 1, 300), although this can be what Peirce later refers to as a mixing up of abduction and induction (e.g. CP 6.145; c.f. CP 8.227).

preservation of those archaeological materials that tell the story of a nation. The role of the researcher, according to Ailio (1923, 19), is secondary and mostly classificatory.³¹

In Ailio's view, "the method of archaeology is that borrowed from the natural sciences, the so-called inductive method that draws general conclusions from particular observations" (Ailio 1923, 20, my translation). After casually mentioning induction, Ailio proceeds to list the types of archaeological phenomena the study of which he thinks is the prerequisite for drawing archaeological conclusions. It should, however, be highlighted that, although Ailio stresses the importance of collecting, he also points out that even if the archaeologist collects all the remains of the past, it would still amount to only a fraction of the "complete cultural belongings of that particular age" (Ailio 1923, 20, my translation). The extent to which Ailio then considers archaeological knowledge as theoretical, ideal, or speculative rather than material or directly observable remains unclear and Ailio never elaborates on how or to what extent the inductive inferences of archaeology should be considered as speculative.

This vagueness in terms of the method of archaeological explanation characterises the history of Finnish archaeology. Instead of elaborating on the method of inference, much of Finnish archaeology has tended to rest on the notion of archaeology as an epistemically open-ended discipline. As a result, Finnish archaeology has tended to highlight the importance of the meticulous collecting of archaeological material rather than an intervening epistemological framework, and when explaining the unfinished and partial view of the past archaeologists have frequently made references to the adolescence of archaeology as a discipline and to the impartial and fragmentary nature of the archaeological record and the archaeological collections rather than the epistemological or methodological shortcomings of archaeology. Whereas for Ailio, Montelius' typological evolutionism and its determinism was the guiding theoretical framework, for the majority of Finnish archaeologists the idealism of nationalism served as an adequate framework for theoretical or methodological reflection for a long time (Article 4). Many have characterised the nationalist view as the romantic's position in reference to a large group of scholars that include, for example, J.R. Aspelin, C.A. Nordman, A.M. Tallgren, C.F. Meinander, Matti Huurre, and to some extent Aarne Äyräpää (Siiriäinen 1989; Salminen 1993; 2003, 172–174; Salo 1994; Muurimäki 2000, 158; Article 4). In this romantic view, the past is often seen as a puzzle that is recoverable through the very existence of the structure that is the puzzle itself (or the cultural contents of an ethnic group), while the puzzle nevertheless paradoxically remains inherently fragmentary and partial (see, for example, Tallgren 1920; Meinander 1967). Because much of Finnish archaeology has hinged on a vague formulation of empiricism that lacks a well-

³¹ In the early 20th century, Finnish archaeology (research) and heritage management (museum work) were still pretty much one and the same thing. Although the first chair in archaeology was established in the early 1920s, research and heritage management did not start to become increasingly separated until the early 1960s (see for example Enqvist 2016; Immonen 2016).

defined view of the nature of inference, it has often been labelled as atheoretical, a misleading view that persists into the 21st century. In Article 4, I explicitly argued that this view of Finnish archaeology as atheoretical is misleading, and that the empiricism characteristic of so much of Finnish archaeology should be seen as a deliberately chosen epistemological position. I will return to this topic below, and I will argue that, as much as the lack of theorising can be seen as a symptom of naive empiricism, it can similarly be taken as a sign of the kind of speculative attitude highlighted in the introduction of this thesis.

10. Deduction

Ultimately, the conceptual vagueness in problematising the relationship between empirical observation of archaeological material on the one hand and speculation as to the unobserved past events on the other led to the emergence of a new critical movement in archaeological theorising. The emergence of New Archaeology in the wake of the Second World War marked a move away from the empiricism of traditional archaeology in search of a more methodologically robust model of archaeological inference (Article 4). Especially the idea of archaeology as an inherently inductive and descriptive form of idealist culture history became increasingly challenged by the new archaeologists who saw empiricism to denote a subjectivist conceptualisation of archaeological knowledge in general (Articles 3 and 5; Marila 2018). In order to sidestep the subjective idealism and rationalism of empiricism, New Archaeology highlighted the relevance of an epistemology that would ultimately eliminate the subjectivities in research (Articles 1, and 3–5; Marila 2018).

In order to alleviate the epistemic pessimism that new archaeologists accused traditional archaeology of, New Archaeology came to highlight two concepts in particular. On the one hand, whereas traditional archaeology had tended to emphasised the inductive method, New Archaeology saw induction as limited to observations made in the present. Instead, the New Archaeology turned to the concept of deduction as the guiding principle in the testing of hypotheses concerning the past (Article 4). On the other hand, New Archaeology came to place increasing emphasis on the concept of process. The aim was to establish law-like behavioural and natural regularities that could be used in inferring past activities from the contemporary archaeological record. An aspect to be kept in mind when assessing the epistemological underpinnings of the New Archaeology, and its impact on European and Scandinavian archaeology, is that similar development in terms of the coming-of-age of archaeology took place in Scandinavian, British, and Americanist archaeology (Article 4). The two latter, however, mark the wider dissemination of New Archaeology's theoretical rigour. While the British (Clarke 1968) variant of New Archaeology tended to promote conceptual clearness, the

American version of New Archaeology highlighted the importance of a deductive logic.

According to Kent Flannery (1973), two types of North American New archaeology existed in the early 1970s. The first type promoted deduction as the key logical schema in devising explanations, while the other pursued an ecologically orientated conceptualisation of process, both cultural and natural in proceeding from observation to explanation. Flannery fittingly refers to the deductivist camp as ‘law-and-order’ archaeologists:

The law-and-order archeologists receive their nickname from the fact that they not only believe that Carl Hempel rose from the dead on the third day and ascended to heaven—where he sits at the right hand of Binford—but, to use their own words, ‘have made the formulation and testing of laws (their) goal.’ (Flannery 1973, 50)

The other camp of new archaeologists that survived into the early 1970 Flannery humorously dubs as ‘Serutan’ archaeologists:

The ‘Serutan’ archeologists pursue a systems-theory framework and derive their nickname from an inordinate interest in the ‘natural regulation’ of systems. For them it seems that the law-and-order archeologists’ version of Hempel—or at least, the way they apply it—is precisely the physical-science approach that [Ludwig] von Bertalanffy rejected in the 1920s as being inadequate in dealing with biological phenomena. (Flannery 1973, 51)

The epistemology of both of these sub-genres of New Archaeology hinges on the existence of an explanatory superstructure. For the law-and-order archaeologists this superstructure is a logical schema, the hypothetico-deductive method, that allows for the establishment of specific inductive generalisations as explanatory laws. For the Serutan archaeologists the superstructure is the system that encompasses both the natural and the cultural. The events within the system then take place according to the specific laws of that system, most importantly the laws of evolution.

Flannery (1973) predicted that the dialectics between these two camps might continue for some years, and in the course of the 1970s, the law-and-order camp slowly died out as result of the critique that was targeted against its reliance on Hempelian covering laws (Article 4).³² Flannery (1973, 52) points out that the Serutan archaeologists saw that the reliance on universal laws mistakes many correlations as causally related. Although strong positive correlation can be established between shoe size and vocabulary size, no causal connection between the two ‘symptoms’ can be demonstrated (Flannery 1973,

³² “The ‘law-and-order’ and ‘Serutan’ archeologists are held together by a dream and a nightmare. The dream is their mutual vision of what archeology could become in the future, when it is science with a capital S. The nightmare is that the ‘young fogeys’ will forever keep it the imprecise pseudoscience that it is today.” (Flannery 1973, 53)

52). Many phenomena that show a high correlation are only coinciding symptoms rather than causally related.

Today, the Serutan type is what is generally understood as processual archaeology.³³ Interestingly, part of the reason for the evolution by which New Archaeology became known as processual archaeology was the critique that New Archaeology received not from the old generation of traditional archaeologist, but instead from two very unexpected fronts.

The first is a large group of young archeologists, many still in their twenties, who are harshly critical of process studies and militantly committed to purely inductive analyses of ‘real’ data from traditionally conducted excavations; this group has been dubbed ‘the young fogeys’ by one processual archeologist. The second group includes some of the original proponents of the new archeology—members of the first archeological generation ever to walk on water—who, once they had achieved some degree of national prominence (or tenure), forgot they had ever espoused processual studies and hastened to join the old guard on the pretext of ‘bridging the generation gap.’ In the idiom of the day, these are referred to simply as ‘cop-outs,’ and they include some of the very people whose earlier studies are frequently cited as good examples of process archeology. (Flannery 1973, 49)

In dealing with the first group, Flannery (1973, 49) is quick to point out that, according to the traditionalist who criticises New Archaeology for adopting the deductive model, deductive reasoning (processual archaeology) can only be carried out after the laws have been established inductively (see Article 4). Interestingly, the second group that Flannery refers to as cop-outs is the same group that gave New Archaeology its impetus in the late 1950s and early 1960s through the concept of cultural process (e.g. Willey and Phillips 1958; Caldwell 1959; Binford 1962; 1965; c.f. Flannery 1967).

The idea of process and evolution in explaining change, then, was central to early new archaeologists, and the hypothetico-deductive method became an important epistemological addition for reasons other than archaeological. Kristian Kristiansen (pers. comm., 27 Oct, 2017) recounts an incident regarding Lewis Binford’s visit to the department of archaeology at the University of Copenhagen in the 1980s. When prompted to explain the reasons for his abandoning the idea of cultural evolution in favour of the hypothetico-deductive method in the late 1960s, Binford contended that, as a description of the steps of inference, the H-D model was simply more convincing and therefore more efficient in attracting research funding.

When the hypothetico-deductive method was abandoned by Binford as a guiding principle for a scientific archaeology in the 1970s, he came to favor

³³ The term New Archaeology is best reserved for the type of reactionary archaeology that saw the use of a formal method of explanation as an alternative to the descriptivism of traditional archaeology: “New Archaeology is as yet a set of questions rather than a set of answers; when the questions are answered it too will be Old Archaeology” (Clarke 1973, 17). In one sense, the ending of the deductivist project made New Archaeology old. Processual archaeology, then, is a more fitting term for what is understood as New Archaeology today.

middle-range theory as the conceptual substitute in bridging between archaeological facts and past processes (Binford 1977; Binford and Bertram 1977; Article 4).³⁴ The idea behind mid-level theories was that anthropological observations could be used as support in explaining archaeological observations. The logic used in this argumentation differed in some respect from that of the hypothetico-deductive method. While both are based on the existence of unifying processes (in H-D a covering law), the logical operation in anthropological argumentation follows the form of analogical reasoning, and is therefore either inductive or abductive in nature. Ironically, then, Binford (2001, 80) writes in his magnum opus *Constructing Frames of Reference* that the logical form of processual archaeology is induction. Binford does not refer to induction as simple enumerative induction, but rather as the process of combining multiple lines of evidence. Because the archaeologist has to be able to combine evidence that is relevant for a particular context, the ecological system rather than a logical schema became normalised as the explanatory superstructure in processual archaeology, a view that survives in today's versions of it (e.g. Manninen 2014).³⁵

One of the central ideas behind middle-range theorising was to also account for the processes responsible for the fragmentation and loss of the archaeological evidence. In many ways, then, Binford's (2001) newly-found idea of the combining of evidence as inductive inference can be seen as a strategy to compensate for the scarcity or the fragmentation of archaeological materials. The task of induction, for Binford, was to combine inductive observations in ways that make the resulting inductive generalisation more robust than the individual chains of observation. Although this view of induction is a fitting description of how archaeologists compensate for the fragmentation of archaeological materials, a similar connection can also be established between scarcity and deduction. It should therefore be noted that the idea of the primary form of the logic of archaeology as deductive rather than inductive also found supporters in Scandinavia, and especially in areas where archaeological materials are often considered especially scarce.

Norwegian archaeologist Arne B. Johansen (1969; 1974) was one of the very few in Scandinavia to adopt an explicitly deductivist conceptualisation of the process of archaeological inference. In fact, Johansen (1969, 99) points out that the small amount of finds relevant for his research topic, the establishment of a typology of non-tool lithic material, is the reason why he devotes a large part of his study to theoretical considerations. While Johansen totally eschews induction, stating that archaeological inference is deductive

³⁴ This move would undoubtedly count as 'copping out' in Flannery's book.

³⁵ The ecological approach of processual archaeology was to some extent also adopted in Scandinavian and Finnish archaeology in the course of the 1970s (see Myhre 1991, 168–171). In the context of Finnish archaeology, elements from the ecologically and anthropologically oriented Americanist archaeology were adopted by Ari Siiriäinen (1974) in his dissertation *Studies Relating to Shore Displacement and Stone Age Chronology in Finland*, but most importantly by Milton Núñez (1984) in his dissertation *On the Subneolithic and Other Cultural Phenomena of the Finnish Stone Age*. These works mark a clear deviation from the culture-historical tradition of Finnish archaeology by placing increasing emphasis on the reconstruction of the natural environment in addition to the study of archaeological artefacts.

through and through, he does so by defining deduction in a fashion that clearly distances him from the positivism of Americanist New Archaeology. First of all, for Johansen, deduction denotes the existence of a conceptual frame of reference that allows the archaeologist to identify any find as pertinent for the purposes of archaeology in the first place. Secondly, Johansen also argues that there is no realm of independent data that would allow us to examine the validity of existing theories objectively or free from other existing theories. Johansen's first point becomes evident through the following quote:

From this point of view an archaeological material should not be regarded as a batch of data but rather as a possibility for data to appear provided we look at the batch through the appropriate type of looking glass, that is the appropriate theory of culture. [...] Without such a culture concept the material would only consist of a bewildering mass of possibilities for datadiscovery where nothing and everything might be relevant. (Johansen 1969, 99–100)

In adopting these tactics, Johansen argues that observations are theory-laden and that the idea of archaeological knowledge as inductive generalisation from observed facts is misguided (see also Dommasnes 1987, 2; Myhre 1991, 172–173).³⁶ Johansen's approach leads to a bunch of problems that he nevertheless also identified. The most important according to Johansen (1969, 101) is that of circular reasoning, or the problem of induction, where the result of analysis is presupposed. This problem of induction, as well as Johansen's second point—that there is no objective data that can be used to objectively compare existing theories—can then be clarified by the following question: “Are there in spite of this general structure any hope now and then to trespass the boundaries surrounding the research and thus bring the final theory of culture outside the initial general frame used in discovery” (Johansen 1969, 101)?

In resolving this question, Johansen (1969, 101, 103) states that, in most types of empirical research, our conceptual frames are an unavoidable element. Nevertheless, in Johansen's opinion, in order to compensate for this situation and make discovery meaningful in the first place, we should consciously aim to create new conceptual models as well as alternative competing theories that can then allow for new data to make sense (Johansen 1969, 27, 102–103). Whereas for the Binfordian (1968) New Archaeology, deduction denoted a logical framework that should ultimately allow archaeologists to distance themselves from the theories that guide their initial observations and give rise to hypotheses, Johansen sees those frameworks as unescapable. By these tactics, Johansen also exposes the hidden empiricism of the explicitly anti-empiricist New Archaeology. Johansen then contends that theories rather than data have the ability to shape existing theories or expectations regarding observation, and that

³⁶ Naturally, in order to transcend the naive empiricism of traditional archaeology, the idea of theory-ladenness of observation was built into positivist New Archaeology as well (e.g. Binford 1977, 1–3).

[i]t will almost never be possible to free oneself from circular reasoning in the meaning used here. The closest approximation to this ideal is now and then to let in as parts of our investigatory theory of man/culture elements without empirical support from the neighboring disciplines. Such analytical devices may then enable us to uncover deviant and adjusting types of data. (Johansen 1969, 103)

In this sense Johansen (1969, 27) argues, in reference to Paul Feyerabend, that analogical thinking for instance has a special role in archaeology in providing alternative theories to the existing ones (c.f. Binford 1972, 57). It is interesting to note that Johansen's suggested procedure of letting in elements without empirical support also denotes a characteristically speculative understanding of the role of theories, another trait that distances him from the deductivism of New Archaeology. Johansen then continues:

Because 'facts' only exist in relation to a preconceived theory it e.g. appears to be no essential difference between speculative and 'facts'-based research. Theories of culture 100 years ago were no more based on speculation than are those of our own time. Then, as in our time a certain amount of speculation and definition of 'facts' must precede the discovery of such facts. Whether the speculation is based on a functional theory of culture or on biblical myths about the human past makes only slight difference because 'facts' like choppers, handaxes and palaeolithic 'tool kits' had no existence until the proper type of theory had been invented. To look at our predecessors in the field as more speculative and negligent of facts than we are is therefore not justified, when we conceptualise 'speculation' like this. Most of the phenomena that are facts to us were simply undefined and thus non-existent in former periods of research. (Johansen 1969, 103–104)

The most often placed criticism against the subjectivism behind this type of speculative approach has been that emphasising conceptual frames over archaeological materials ultimately leads to the idea that the facts can support any theory. Johansen anticipates this argument by distinguishing between two types of deductions, consistent and non-consistent deductions. Johansen (1969, 104) then states that the "significant feature of Nazi-archaeologists was not that they had a particularly firm preconceived theory but that they let this theory influence too much the deductions based on the data". While Johansen's solution might appear somewhat hastily constructed at first, upon more careful analysis, it, and his whole philosophy of archaeology, includes many of the traits of the type of speculative empiricism that was outlined in Part Two. In other words, speculative empiricism entails the idea that, while we encounter objects aesthetically, phenomena are never exhausted through their appearances. The points of connection between speculative empiricism and Johansen's philosophy of archaeology can be further clarified through the following Whiteheadian motto: "We must be systematic; but we must keep our systems open. In other words, we should be sensitive to their limitations. There is always a vague 'beyond', waiting for penetration in respect to its

detail” (Whitehead 1956, 8; Article 5). Through his analysis of theory-ladenness, Johansen demonstrates how important creative use and creation of concepts and theories is for empirical sciences. Had Johansen been more explicit in his somewhat vaguely formulated argument that new theories can behave just like new facts in their capacity to challenge existing conceptual models, his ideas might have been more easily accepted by his contemporaries (e.g. Malmer 1980).³⁷

Johansen’s ideas were to a certain degree welcomed in Finland by professor of archaeology C.F. Meinander (1977, 78–79; Article 4, p. 31). However, the deeply subjectivist undertone of Johansen’s approach remained somewhat unappealing to Meinander who wanted to retain a stronger degree of openness in terms of the archaeologist’s conceptual framework. Instead, Meinander opted for the view that can be characterised as *find positivism* (Article 4). However, it is important to notice that the type of positivism adopted by Meinander is not related to logical positivism, and that the word positivism is misleading in this context. Just like Johansen’s definition of archaeology as deductive differs from the deductivism of New Archaeology significantly, Meinander’s definition of positivism differed significantly from the positivism of New Archaeology. Both Johansen’s deductivism and Meinander’s *find positivism* highlight important aspects of speculative philosophy rather than positivism.

...

So far, we have seen that archaeology’s interpretive dilemma is characterised by two problems in particular. The first one concerns the problem of induction: if induction is generalisation from observation, how can those observations ever be of the past rather than remain hopelessly of the present? The other one is also connected to the problem of induction, but intimately through deduction: if all observations are theory-laden, how can the amount of archaeological knowledge ever grow, or how is any form of empirically derived knowledge possible in the first place? The latter question is of importance for the kind of speculative attitude promoted in this thesis. How can we come to understand anything beyond the confines of our own thinking, concepts, theoretical structures, or understanding? While some solutions to this problem were already proposed above, most importantly through the analysis of Arne B. Johansen’s deductivism, the part will turn to presenting more explicit attempts to transcend the inductive/deductive dichotomy in archaeology, and to reiterating their philosophical underpinnings.

³⁷ In philosophy of science, Sami Paavola, for example, has made an interesting observation concerning the theory-ladenness of observations. In discussing the so-called reversible figures where the same data can be interpreted in two different ways, Paavola (2015, 233), notes that in discussions on the theory-ladenness of observations the observation-ladenness of theories is seldom noted. At times, as in visual illusions, the perception is ‘forced onto the observer’: “Hypotheses are [...] closely related to observations, and they have their origins in this close relationship”. For an archaeological example, see, for example, Edgeworth 2012.

11. Inference to the Best Explanation and abduction

While undoubtedly problematic, Johansen's idea of the inescapable subjectivity of archaeological observation nevertheless sparked interest in wider debates in the relationship between subjectivity and objectivity in Scandinavian archaeology at a relatively early stage (Malmer 1980; Johansen 1982; c.f. Myhre 1991). The ideas developed by Johansen also anticipated many of the characteristics that became widely accepted in archaeological theorising in the course of the 1980s and the 1990s. Johansen's philosophy of archaeology can therefore be seen as a contribution towards the emergence of interpretive archaeology ten years later, and Johansen should accordingly be included in the list of early interpretive archaeologists. In particular his influence, although not a topic addressed by Johansen himself, contributed towards discussing the role of social theories in archaeology (Myhre 1991, 173). It is precisely this increasing interest in social theory in archaeology that brings us to our next topic.³⁸

As the deductivist program of New Archaeology faced increasing critique in the course of the 1970s, the epistemology of archaeology marginalised. On the one hand, this marginalisation marks the proliferation of archaeological theorising that drew not so much from positivist philosophy of science, but instead from social, cultural, and linguistic theories, such as the broad fields of ethnography, anthropology, structuralist semiotics, poststructuralist critical theory, hermeneutics, phenomenology, and pragmatic semiotics (Preucel 1991; Articles 1 and 2). Those who ventured into social theory mainly borrowed their philosophical frame of reference from linguistics, particularly from structuralism and poststructuralism, but also from pragmatic semiotics (c.f. Bapty and Yates 1990; Preucel and Mrozowski 2010). Those who did continue the philosophy of science program initiated by New Archaeology mostly turned to postpositivist Kuhnian philosophy of science on the one hand and scientific realism on the other in conceptualising the nature of archaeological inference (c.f. Kelley and Hanen 1988; Gibbon 1989). The central aim of this 'postprocessual epistemology of archaeology' was to find novel conceptualisations for the process by which the unobserved is inferred from the observed without recourse to logical positivism or radical subjectivism (Article 5).³⁹ In this respect, pragmatist philosophy in particular came to form an important inspiration for philosophers of archaeology in search of the third culture (see Articles 1–3).

³⁸ Social aspects, both past and present, were, of course, discussed earlier (e.g. Tallgren 1934; Clark 1939). To a large extent, having witnessed the Second World War, New Archaeology's idea of the method of explanation, validation, and interpretation aimed towards the elimination of personal or social authority in science. Further distinction should be made between social theory and theorising archaeological inference as a matter of social practice rather than formal logic.

³⁹ Postprocessual here refers to interpretive archaeology, not only because interpretive archaeology became after processualism but because postprocessual archaeology was generally interested in those processes that take place after the archaeological processes, which were the focus of processual archaeology.

In trying to solve the problem of inference from observation to the unobserved, several authors have come to suggest that archaeological inference is best understood in terms of analogical or abductive inference, not induction or deduction (Articles 1 and 3). The logical operation akin to abduction known as Inference to the Best Explanation (IBE) in particular became popular among archaeologists in the course of the 1980s (see Article 3, p. 72 for references; c.f. Marila 2013). Whereas much of New Archaeology's epistemology, for instance, had stressed the inferential schema, these new formulations of the method of inference aimed to transcend the inductive/deductive dichotomy by highlighting the actual practice as well as the social and subjective extent of the inference process (Article 3; Wylie 1985; Kelley and Hanen 1988, chapter 4; Gibbon 1989, chapter 7).

An early example of what can be considered an attempt to transcend the schematic induction/deduction dichotomy by reference to a practical conceptualisation of inference was presented by Leroy Johnson (1972, 368) as part of his critique of New Archaeology's overarching reliance on the hypothetico-deductive method. In his analysis of the troubles that the new 'avant-garde archaeology' (i.e. New Archaeology) can lead to, Johnson points out three major shortcomings: (1) social scientists have never discovered law-like regularities that are not trivial and therefore uninteresting to the archaeologist, (2) law-like generality would obscure the simplest phenomena that behavioural scientists are interested in, and, most importantly, (3) deduction cannot deal with likelihood or degree, because for deductive logic correctness is an all-or-nothing affair (Johnson 1972, 367).⁴⁰ In Johnson's view, the procedure of deductive testing suggested by avant-garde archaeology would, contrary to its objective of increasing objectivity, end up creating unwanted conceptual biases and that, in order to avoid those biases, archaeology should be radically empiricist. Johnson then argues that the *modus operandi* of archaeology "is to include systematically all the characters or traits that the investigator can observe" (Johnson 1972, 373):

The archaeologist, after the descriptive analysis is done, then tries to determine *why* the data were arranged or grouped in such-and-such a way. Outside controls and independent data help provide the answer. [The] explanation may include factors such as geographic situation and tool-kit function, as well as age, in explaining classification or seriation of archaeologic assemblages. (Johnson 1972, 374, emphasis original)

Johnson's (1972) socially enlightened alternative to explanation by deduction, then, is what he calls the 'analytical narrative', the procedure of linking numerous inductively drawn generalisations and background knowledge from multiple fields in order to account for the uncertainties or other weaknesses nested in those generalisations. In this sense, following the idea that the simple procedure of deductively testing the correctness of a hypothesis is not possible, the archaeologist assumes some sort of relevant connection between

⁴⁰ Johnson, born in 1935, would probably not qualify as a young fogey (see above).

multiple inductive inferences and uses those connections to strengthen the overall reliability of a particular conclusion. Other scholars have made similar claims about the most common character of archaeological inference as the analogical combining of relevant observations across a wide range of domains, both past and present (e.g. Ascher 1961; Morgan 1973; Smith 1977; Shelley 1999; Wylie 2000; 2002; Binford 2001; Currie 2016).⁴¹

Alison Wylie (1989b) refers to the combining of evidence in order to construct more robust theories as ‘cabling’. In this metaphor, the cable consists of multiple strands which together make the cable considerably stronger than any individual strand, or any individual link in a cable, for that matter. The process through which one aims to establish connectivity between individual strands of evidence Wylie refers to as ‘tacking’. Tacking, for Wylie, denotes a dialectical movement between strands of evidence in order to establish to what extent any particular strand of evidence might be relevant for the question at hand (1989b, 14). In other words, when tacking between perspectives, we seek to distance ourselves from our own experiences and theories in order to find evidence that simultaneously supports and challenges the existing theory. One central element in this process is surprise (Wylie 1989b, 16). The observation of a surprising fact can lead us to challenge a particular pre-existing theory. Wylie contends that

[w]e frequently find out that we were wrong, that the data resist any interpretation that will make them consistent with our expectations, and that we are dealing with a subject (cultural or otherwise) which is very different from anything with which we are familiar. We are then forced by the evidence to consider completely different interpretive possibilities than we have entertained in the past, and even to rethink deep-seated orienting presuppositions about the nature of cultural phenomena. (Wylie 1989b, 16)

Wylie then concludes by pointing out that of course facts are not totally given, but that it would be similarly fallacious to assimilate them to theoretical constructs, as is characteristic of relativist views of the relationship between objectivity and subjectivity or fact and theory (Wylie 1989b, 16–17).

In addition to providing a description of how strands of evidence are combined, Johnson’s (1972) analytical narrative highlights that, in combining a host of inductive inferences, archaeological inference succeeds in including those weak inductive inferences that might end up eliminated in favor of more robust hypotheses if the deductive procedure of testing was followed. This does not only mean that the archaeologists should know their materials as intimately as possible but that, in order to identify some insignificantly seeming evidence as relevant, they should also acquaint themselves with research areas outside of archaeology. Ethnography in particular is seen as a

⁴¹ Note also that already Müller and, before him, C.J. Thomsen, stressed that the study of artefacts alone is not sufficient for the construction of chronology, but archaeology should always take the find circumstances into account.

valuable field by Johnson, but he similarly stresses the importance of philosophy, zoology, statistics, and mathematics (Johnson 1972, 375).

In characterising the logical form of the analytical narrative, and in order to sidestep the problem of induction, Johnson identifies a third mode of inference that he refers to as the Sherlock Holmesian method of induction (Johnson 1972, 368).⁴² While simple enumerative induction generalises from the observation of similar facts, Holmesian induction combines those individual inductions by speculating about possible linkages between them. Needless to say, wide-ranging background knowledge in a variety of fields or domains—and therefore the ability to identify a larger number of small details that do not fall within preconceived theoretical models or series of inductive generalisations as significant—becomes an important part of archaeological inference. Johnson's reference to Holmes, then, marks a widespread use of the detective analogy in archaeology both as a metaphor and, more importantly, in terms of the actual inferential process (Kelley and Hanen 1988, 360 [IBE]; Shanks 1992 [metaphor]; Shanks 1996 [abduction]; Strinnholm 1998 [abduction]; Pearson and Shanks 2001 [abduction]; Holtorf 2005; 2007 [metaphor]; see also Klejn 2001, 40 for references).

While the detective metaphor is useful in describing the practice rather than the form of archaeological inference, it also introduces a source of confusion in terms of the nature of inference. Holmes himself refers to his method as a form of deductive reasoning (based on the axiom 'when you have eliminated all which is impossible, then, whatever remains, however improbable, must be the truth'), but it has been pointed out that detective reasoning is in fact closer in form to abductive inference (c.f. papers in Eco and Sebeok 1983; Anderson and Twining 2015). Furthermore, the sense in which detective reasoning can be considered an instance of abductive inference rather than deductive inference also risks the confusion between two further understandings of the nature of detective reasoning; detective reasoning as a creative logic of hypothesis creation (abduction), and detective reasoning as a logic of hypothesis selection (IBE). As will become apparent below, this distinction also marks a distinction between gradual hypothesis elimination and hypothesis creation, and by this token also two very different takes on what constitutes inference to begin with. Therefore, the distinction is also vital for a speculative epistemology of archaeology which aims to intensify the importance of creative hypothesis formation rather than the elimination of speculation by recourse to a priori hypothesis selection criteria.

Inference to the Best Explanation

The concept of Inference to the Best Explanation was first introduced in 1965 by philosopher Gilbert Harman:

⁴² Compare with Sophus Müller's use of 'hypothesis' (see above).

I claim that, in cases where it appears that a warranted inference is an instance of enumerative induction, the inference should be described as a special case of another sort of inference, which I shall call ‘the inference to the best explanation.’ [...] In making this inference one infers, from the fact that a certain hypothesis would explain the evidence, to the truth of that hypothesis. In general, there will be several hypotheses which might explain the evidence, so one must be able to reject all such alternative hypotheses before one is warranted in making the inference. Thus one infers, from the premise that a given hypothesis would provide a ‘better’ explanation for the evidence than would any other hypothesis, to the conclusion that the given hypothesis is true. There is, of course, a problem about how one is to judge that one hypothesis is sufficiently better than another hypothesis. Presumably such a judgment will be based on considerations such as which hypothesis is simpler, which is more plausible, which explains more, which is less ad hoc, and so forth. I do not wish to deny that there is a problem about explaining the exact nature of these considerations; I will not, however, say anything more about this problem. (Harman 1965, 88–89)

In these formulations, Harman’s IBE “corresponds approximately” to abduction (Harman 1965, 88), and his vague conceptualisation of the selection criteria should be seen against this identification.⁴³

Some years later, Harman (1968) gave a revised version of IBE in which he states that all enumerative inductions are cases of IBE. For Harman, then, IBE is inductive, not abductive. Furthermore, Harman states that IBE is not the operation of comparing alternative explanatory hypotheses, but rather the comparison of competing explanations. In this sense, Harman aims to highlight that induction already is an explanation of the observations included in it, and that the important part in assessing competing hypotheses is their fitness in the existing body of knowledge: “The best explanation is the one that fits in best. It is inferable if it fits in sufficiently better than competing alternatives” (Harman 1968, 531). And he continues: “inference to the best explanation is ultimately inference to the best total explanatory picture of the world” (Harman 1968, 533). By these tactics, Harman sidesteps the problem of induction by arguing that all enumerative inductions are ampliative, not because induction assumes the truth of the generalisation that it tries to establish through observation of its instances, but because the evidence of induction is already dependent on other inductions, or because inductive inferences have a history (Harman 1968, 531–532; c.f. Norton 2003; for the distinction between types of IBE in reference to induction, abduction, and the logic of discovery, see Hintikka 1998; Minnameier 2004; Paavola 2006;

⁴³ For some, abduction does not conform to formal logic because it also includes instinctive, intuitive, emotional, and other vaguely quantifiable reasons as important factors in pursuing or choosing a particular hypothesis over other possible ones (Article 3; c.f. Semetsky 2004; Paavola 2005; Forth 2018; see, however, Ma and Pietarinen 2018 who provide a formal description of abduction). Peirce would at times support the view that abduction is an instance of insight (CP 5.181), but he does not see intuition (MS [R] 595) or instinct (MS [R] 1573) as inferential.

Campos 2011). Nevertheless, it remains unclear whether Harman's identification between IBE and induction really solves the problem of induction.

Philosopher Peter Lipton (1991) provides a further developed account of the selective process of competing hypotheses. Lipton (Lipton 1991, 59–61) argues that, whenever we are faced with evidence that requires an explanation, all hypotheses go through two epistemic filters. First, we select a group of potential or plausible hypotheses out of all possible explanations, and out of these possible hypotheses we select the best possible explanation. Unlike Harman, Lipton treats IBE as a form of inductive inference, and therefore concentrates on how we compare or evaluate multiple plausible hypotheses (c.f. Campos 2011). This of course leads to the problem of identifying the criteria that allow the selection of one hypothesis over competing ones in the first place. In discussing the selection criteria Lipton makes one central distinction, that between likely explanations and lovely explanation (Lipton 1991; c.f. Marila 2013). Whereas likely explanations would initially seem like those that scientist would choose over other less likely ones, Lipton points out that the likeliest explanations may not be the ones that provide the greatest sense of understanding. To say, for example, that the tastiest meals are prepared by great chefs may be a likely explanation, but it does not, in all its triviality, provide a deeper understanding of gastronomy (Lipton 2000, 187). Similarly, Newtonian mechanics, in providing a broad understanding of the behaviour of physical objects, may be a lovely explanation, but it may not be the likeliest (Lipton 1991, 62).

Lipton then argues that the best explanations are those that provide the greatest sense of understanding while still being the most likely ones. Accordingly, Lipton suggests that Inference to the Best Explanation should be construed as Inference to the Loveliest Explanation (2000, 187). If Lipton is to establish a connection between likeliness and loveliness, he has to answer the following three questions:

- (1) How do we identify the features of explanations that contribute to the degree of understanding they provide?
- (2) How do we show that the aspects of loveliness match judgements of likeliness, or that the loveliest explanations also tend to be those that are judged likeliest to be correct?
- (3) How do we show that, granting the match between loveliness and judgments of likeliness, the former is in fact the scientists' guide to the latter, and, most importantly, that loveliness is actually a form of explanation?

In answering the first question, Lipton (2000, 188) stresses the importance of contrastive reasoning: why the observed happened rather than something else. In identifying contrafactual effects, we infer to the possible causes behind them. This in turn shows to us that not any cause will suffice in explaining the observed effects; “[n]ot all causes provide lovely explanations, and an account

of contrastive explanation helps to identify which do and which do not” (Lipton 2000, 188).⁴⁴

Lipton’s answer to the second question is partly connected to the first. Lipton argues that in establishing the match between loveliness and likeliness, we actually combine a host of possible explanations and eliminate those that are in conflict with the observed facts. The match between loveliness and likeliness is therefore established by comparing cases with known connection between causes and effects:

This general pattern of argument, which seeks explanations that account not only for a given effect, but also for particular *contrasts* between cases where the effect occurs and cases where it is absent, is very common in science—for example, wherever use is made of controlled experiments. (Lipton 2000, 189, my emphasis)

In other words, Lipton’s answer to questions (1) and (2) is that through the comparison of data against and between possible hypotheses, we choose those ones that are likeliest to be true, and because the resulting hypotheses are the most likely accounts of the total account of the world, they are also the loveliest in terms of their capacity to provide the greatest sense of understanding.

This leaves Lipton with the task of *demonstrating* why a given hypothesis is likely just because it is lovely, and why lovely hypotheses therefore are also explanations. In this respect, Lipton points out that a critic of the model could argue that, although the connection between loveliness and likeliness can be established, IBE does not necessarily have anything to do with explanation but is instead based on other factors. In other words, “[w]hy should it be that the hypotheses that scientists judge likeliest to be correct are also those that would provide the most understanding if they were correct?” (Lipton 2000, 190). Lipton simply answers that “[i]f scientists select hypotheses on the basis of their explanatory virtues, the match between loveliness and judgments of likeliness follows as a matter of course” (Lipton 2000, 190). Lipton (2000, 191) then concludes—by adding one metalevel—that the inference that a lovely hypothesis is also the likeliest to be correct is simply the best possible explanation. In this sense, Lipton’s take on IBE highlights how science in practice does not follow a clear template or procedure, but is always dependent on the nature of available evidence.

Harman’s and Lipton’s analyses of IBE as inductive highlight an important distinction that can be made when assessing the relevance of induction as an

⁴⁴ Hypotheses are to be regarded in relation to various other phenomena and subsidiary information as well as the researcher’s background knowledge. This is also evident in discussions on abduction. Abduction requires background knowledge and a consideration or anticipation of counterarguments in practice. In philosophy of science this understanding is sometimes referred to as ‘strategic abduction’ (Paavola 2004), ‘model-based abduction’ (Magnani 1999), or ‘abduction as practical inference’ (Kapitan 2000). Note also that, in addition to this theoretical or sentential side of abduction, one can identify another, more practical, sensorial, or manipulative sense in which abduction takes place in the company of things: “A man can distinguish different textures of cloth by feeling; but not immediately, for he requires to move his fingers over the cloth, which shows that he is obliged to compare the sensations of one instant with those of another” (CP 5.221; c.f. Article 3; Shelley 1996; Magnani 2004. See also, for example, Pétursdóttir 2014).

ampliative form of inference; that between induction as formal or schematic and induction as factual or material. In a treatment of induction similar to Harman's, John Norton (2003) refers to induction as a material theory and argues that there are no universal inference schemas that inductive reasoning should follow. Instead, inductive inference is grounded in facts and the relevance of those facts is limited to particular domains. Norton then contends that

[t]he important point is that the facts prevailing in the relevant domain dictate what can count as an explanation for the evidence. Indeed that something explains at all is itself recovered by direct inspection of the case at hand and not by demonstrating conformity to some externally supplied template for what counts as a good explanation. (Norton 2003, 657–658)

Because induction does not have wide-ranging generality but is instead limited to particular observations, Norton (2003) proposes that the specificity of inductive generalisations will have to be compensated by combining inductions over a broader field. “In learning more facts, we extend our inductive reach by supplying more localized inductive inference schemes” (Norton 2003, 647). Interestingly, then, similar ideas were put forward as part of the critique targeted against New Archaeology's centralisation of the deductive method and its denouncement of induction under the auspices of Hume. As was already noticed above, the idea that induction is not limited to a general inductive schema is therefore well-established also in the epistemology of archaeology (e.g. Dommasnes 1987; Wylie 1989b; Watson 1991; Strinnholm 1998; Binford 2001; Articles 3 and 4). The real relevance of Norton's analysis for our exposition of IBE is that, much like induction does not follow any particular schema, the selection of hypotheses in IBE is not based on any formal rules that would allow a secure comparison of hypotheses, but instead on the material constituents of a hypothesis (Norton 2003, 656–657; c.f. Norton 2010).

Because the IBE model of hypothesis selection provides a much more intuitive and practical description of the inference process than the formalist accounts of induction or deduction, it has become widely discussed in archaeology (e.g. Kelley and Hanen 1988; Hanen and Kelley 1989; Routledge 1995; Fogelin 2007; Bogaard 2015). However, many treat IBE as a further developed form of abductive inference with little regard for the differences between IBE and abduction. As result, passing reference to abduction is made in the discussions on IBE, while the role of abduction in IBE remains vague in these treatments.

Lars Fogelin's (2007) treatment of the uses of IBE in archaeology does highlight the important distinction between IBE as hypothesis selection and IBE as hypothesis creation. Fogelin differentiates between Harmanian and Liptonian understanding of IBE as an inductive logic of hypothesis selection, and IBE as a form of hypothesis creation similar to how Norwood Russell

Hanson (1958) sees hypothesis formation and scientific discovery as instances of abductive inference. Having made this distinction, Fogelin does not deal with hypothesis formation, discovery, or abduction, but instead proceeds to discussing IBE in terms of possible hypothesis selection criteria. Fogelin's (2007, 618–619) seven criteria, some of which derive from Lipton (1991) are generality, modesty, refutability, conservatism, simplicity, empirical broadness, and multiplicity of foils (i.e. counterarguments). In order to show that culture-historical, processual, and postprocessual archaeologies share an epistemological connection, Fogelin then presents four cases from the history of archaeology and argues that, regardless of how archaeologists themselves have conceptualised the process of hypothesis selection (as inductive, hypothetico-deductive, or hermeneutic), the inference process has actually followed the general model of IBE, and that the selection of “the most compelling” explanation has been founded on the above mentioned seven selection criteria.⁴⁵

Another discussion of IBE as a characteristically archaeological method of inference is provided by Kelley and Hanen (1988; c.f. Hanen and Kelley 1989). In their exposition of the history of archaeological inference, primarily targeted against the use of deduction in the course of the New Archaeology, Kelley and Hanen aim to show that IBE is the most common form of archaeological inference. While much of the book is dedicated to discussing the philosophy of science in archaeology, one chapter provides a host of archaeological cases where IBE was used. One of Kelley and Hanen's examples reviews Emil Haury's 1958 study of the archaeological evidence found at Point of Pines in southern Arizona (Kelley and Hanen 1988, 279–286). In his study, Haury reported anomalous findings that did not fit the generally accepted account of the Point of Pines site. These new findings included, for example, clay vessels made of local clay but decorated in a fashion characteristic of the northern Kayenta region rather than with local motifs, a D-shaped kiva normally associated with northern regions, as well as botanical remains of plant varieties more common to the northern part of the state. In trying to explain the surprising findings, Haury concluded that migration from the north would explain the anomalies. Interestingly, Haury, did not set out to interpret the materials with the migration hypothesis in mind. In fact, Haury was sceptical of migration hypotheses to begin with, and was only inclined to adopt one in light of the unexpected observations (Kelley and Hanen 1988,

⁴⁵ It is interesting that Fogelin at the same time argues for generality and broadness (explanations should cover a wide field of different aspects of the material and be applicable in a variety of cases) as well as for modesty, simplicity and conservatism (explanations should not be applied to everything, they should be simple rather than complex, and well-established explanations should not be discarded easily). There is, of course, no good reason why all explanations should be simple or applicable to a wide variety of cases. In fact, this kind of conservatism may well result in a systematic neglect of the possibilities of science. Consider the following passage from Peirce: “[E]ven the most admirable of modern reasoners, and in those kinds of reasoning in which they are at their very best, occasionally draw inferences that [are] *utterly* unfounded, but which more or less tinge all their subsequent teachings. Yet considering modern science as a whole, I believe its positively wrong conclusions are of small moment compared with its neglect systematically to consider possibilities among which there are likely to be keys to undiscovered treasures of truth.” (EP 2, 465–466, emphasis original)

281). Kelley and Hanen (1988, 285–286) then point out that Haury’s intimate knowledge of the materials in both regions partly contributed towards noticing the discrepancies, whereas many others may have missed them, and, more importantly, that Haury’s adoption of the migration hypothesis led to increased readiness for other sceptics to do the same.

Interestingly, then, Kelley and Hanen (1988) do not only demonstrate that much of archaeological reasoning follows a pattern (in their view the model of IBE) that does not easily conform to either the inductive or the deductive schema; they also highlight that the selection of hypotheses does not follow clearly defined selection criteria. Instead, Kelley and Hanen contend that the evidencing process is affected by social factors such as the personal prejudices of the researcher or the core beliefs held by the scientific community. In a Kuhnian fashion, Kelley and Hanen then point out that the core beliefs of the discipline are often considered sacred until the amount of conflicting evidence makes it impossible to support that view. Similar examples of the holding power of existing theories in the history of Finnish and Swedish archaeology were presented in Article 4.

Instead of telling much about how possible explanations are selected in light of the available data, the cases discussed by Kelley and Hanen (1988) perhaps better showcase how some hypotheses are considered more appealing because they fit the particular scientific atmosphere or because there exists a critical mass that will also see those particular hypotheses as worthy of further examination. Furthermore, it is extremely difficult to research why individual researchers choose to pursue one hypothesis over other possible ones because usually only the successful hypotheses make it into the publications. In light of the above, IBE can perhaps better be described as inference to the pursuit-worthiness of hypotheses or as ‘inference to *better* explanation’ (McKaughan 2008; Bogaard 2015; Nyrup 2015; 2020). Both perspectives highlight that the logic of archaeology is not a matter of logical schemas, but is better understood as an activity and as a personal and historical process (Articles 1–5). In this process, the personal traits of the researcher, such as the audacity to follow vague hunches or take half-baked ideas seriously, are much more important than an explicit inferential schema (c.f. Dewey 1929, 247; Snyder 2005; Lahiri 2017). Furthermore, as was discussed in Article 3 in particular, the reasons for selecting one hypothesis over another are often impossible to explicate, and are instead only vaguely identifiable. While discussions over IBE, as we saw above, have remained somewhat vague about the nature of inference as a process as well as about the role of ambiguity in it, these aspects have been more intimately incorporated in discussions on abductive inference. I will therefore limit my exposition of IBE as hypothesis selection to the above examples, and instead turn to our second understanding of detective reasoning as a way to transcend the inductive/deductive dichotomy; the abductive logic of discovery.

Abduction

For the Popperian New Archaeology, hypothesis formation remains a matter of psychology rather than logic (e.g. Binford 1977, 2; Article 3, p. 73). In this context, it does not matter whether the hypothesis is introduced in a dream or a hallucination; the important thing is whether the hypothesis will survive testing. While IBE is more concerned with the process of hypothesis selection and treats hypothesis formation as an independent realm, abduction concerns both of these. It was argued above that IBE can either be considered as an instance of abduction or induction. Whereas both induction and abduction find relevance in the context of IBE, I will turn to discussing abduction as the logic of hypothesis creation. However, the discussion also concerns the distinction between induction and abduction, and in fact the end of the last chapter of this part is dedicated to this distinction in general.

An early reference to abduction in the context of archaeological theory is provided by Fred Plog (1974, 19) who sees abduction as the central operation by which hypotheses are introduced. Plog explicitly states that abduction is not an instance of inductive inference, and that the quality of an abduction is dependent on the creative ability of the individual scientist. Plog refers to Hempel (e.g. 1965, 6) in his view that imagination and guessing are what give rise to possible explanatory hypotheses, although it should be noted that Hempel, along with other hypothetico-deductive philosophers, such as Popper, does not see how matters of psychology or creativity are relevant for the logic of science. Plog then writes that

[f]amiliarity with data is an essential condition for carrying out any research, for operationalizing any hypothesis. But, while familiarity is essential, the probable validity of an hypothesis cannot be evaluated on the basis of the amount of data an investigator treated in creating it. It is a function of his creative ability as a scientist, and no more. One often suspects that those who wish to explain hypothesis creation as a linear function of data examination are trying either to shift responsibility for hypotheses they could not create or to protect themselves lest they be wrong. The courage to risk being wrong is the essence of innovation. And, to claim that explanations are derived from data rather than the minds of scientists is intellectual cowardice. (Plog 1974, 19)

In arguing the above, Plog hints towards a certain kind of mysticism in hypothesis creation that was never taken seriously as part of the Hempelian or Popperian epistemology of New Archaeology. This mysticism is best understood as an element of subjectivity. In this sense, Plog's understanding of abduction is inspired by Norwood Russell Hanson's (1958) Peircean understanding of the logic of discovery as fundamentally abductive rather than inductive (Plog 1974, 19). Hanson, who can be considered one of the first to introduce the concept of theory-ladenness in philosophy of science, held that abductive inference and subjective perception are two sides of the same coin (Hanson 1958, 86). In order to understand this connectedness between

inference and perception one has to realise that, for Hanson, theory-ladenness in science means ‘causality-ladenness’ (Heidelberger 2003, 140). This means that, while we can perceive effects without a background theory, we need one to understand their relevance for the context in which they take place. In other words, we need a theory to form a causal connection between observations. “Causes certainly are connected with effects; but this is because our theories connect them, not because the world is held together by cosmic glue” (Hanson 1958, 64). The identification of causal connections pertinent to a particular context, then, hinges on a wide range of pre-existing theoretical background knowledge. Otherwise we would not be able to distinguish causality from random coincidence (Hanson 1958, 64). Furthermore, because any contextual detail can be possibly relevant for a given problem, the identification of a possible cause for that particular detail is important. The abduction of a possible cause hinges on previous observations of causes for similar effects, but the resulting hypothesis is by no means determined by those previous experiences. Rather, the relevance of a hypothesis is evaluated in light of imagined possible observations (Article 5). Perception, then, is permeated by abduction: “The dawning of an aspect and the dawning of an explanation both suggest what to look for next” (Hanson 1958, 86).

Unfortunately, the majority of Plog’s study is dedicated to the development of methodological rigour, and he has little more to say about the aspects that are important for the creation of hypotheses. Interestingly, the sense in which Plog refers to abduction as the key logical operation behind the formation of (possibly) successful hypotheses echoes in the way in which Michael Shanks sees abduction as a force of hypothesis creation. Shanks’ description, however, ultimately succeeds in retaining the sense of mysticism or personal wonder that characterises abduction as the logic of perception:

Abduction is this process of reasoning backwards, studying tracks, and is rooted in all the senses and faculties. Every dimension of experience and memory may be helpful in making the imaginative conjecture. Abduction is the work of intuition, defined not as extra-sensory perception, but as a lightning recapitulation of rational processes. After all, anyone could do what Holmes does—it is elementary; only he does it so quickly. (Shanks 1996, 38)

In another context, Pearson and Shanks (2001, 60) contend that abduction “is a creative process of speculative modelling which demands no hierarchy between empirical attention, analysis and leaps of the imagination”. The sense in which Shanks (1996, 38–39) then refers to abduction as a practical, creative, embodied, and even emotional reasoning highlights the development in which archaeologists interested in epistemological matters turned to the role of the body, perception, and the senses in the course of the 1980s and the 1990s (e.g. Edgeworth 1990; Tilley 1994, see, especially, Article 3 for discussion on abduction and the senses, and for further references to archaeological literature on the topic). Nevertheless, although Shanks is careful in making a

distinction between abduction and other modes of inference, namely induction and deduction, he does treat abduction as the procedure by which hypotheses are created for later testing.

Like Shanks' treatment of abduction, Cameron Shelley's *Visual abductive reasoning in archaeology* (1996; see also Shelley 1995) reflects the phenomenological and embodied understanding of the epistemology of archaeology. In his article, Shelley stresses the centrality of visual mental imagery in generating archaeological hypotheses. Shelley (1996, 280) contends that archaeology is a particularly well-suited context for the study of abductive reasoning since "archaeologists are routinely confronted with the visual properties of new, concrete objects and required to explain them". Shelley then points out that one particular operation by which mental imagery are formed in archaeology is abduction. However, in his analysis of the suitability of abductive inference in the context of archaeology, Shelley (1996, 279) argues that Peircean abduction has one drawback—"its restriction to a language-like medium of representation, namely sentences". Shelley's solution, then, is to expand abduction to govern the visual realm. In order to understand the reasoning behind Shelley's description of abduction as limited to the sentential level, and in order to contextualise his solution to extend abduction beyond its sentential boundaries, which I will take up shortly, a brief exposition of Peirce's understanding(s) of abduction is needed. At least two very different meanings of abduction can be identified in the course of Peirce's career (Paavola 2005), and Shelley only succeeds in accounting for one.

In an early formulation from 1878, Peirce identifies abduction as a syllogism by contrasting it to induction and deduction. Note that, at this point in his career, Peirce used the word hypothesis instead of abduction; the two terms are synonymous:

Deduction

Rule.—All the beans from this bag are white.

Case.—These beans are from this bag.

∴Result.—These beans are white.

Induction

Case.—These beans are from this bag.

Result.—These beans are white.

∴Rule.—All the beans from this bag are white.

Hypothesis [Abduction]

Rule.—All the beans from this bag are white.

Result.—These beans are white.

∴Case.—These beans are from this bag. (CP 2.623)

In these sentential descriptions, or syllogisms, deduction states the necessary consequences of the application of a rule to a case, induction generalises a rule from the observation of a case, and abduction infers a case from a rule and a

result. The reason for Peirce's identification of abduction as a form of inference distinct from induction and deduction is that, by doing so, Peirce intended to argue that the introduction of new ideas through abductive inference ('Case' in the hypothesis [abduction] example above) is a matter of logic, just like it is in induction and deduction. Whether Peirce succeeds to do this with his syllogism, remains a matter of discussion. Jaakko Hintikka (1998), for instance, has pointed out that the syllogistic form leads to problems that do not work in Peirce's favour. Hintikka argues that, in the syllogistic form, the inference does not even provide probabilistic support for the abductive conclusion, a fact that makes it hard to accept abduction as a form of inference and therefore part of logic. Hintikka (1998, 511–512) then suggests that, in order to understand abduction as an instance of ampliative inference, one should understand it as a form of interrogation, or as the act of asking why-questions. According to Hintikka, abduction should be seen as part of an interrogative method, not as an inferential schema. In this sense, Hintikka points towards an understanding of abduction that differs from the sentential definition significantly.

Later in his career, Peirce indeed revised his understanding of abduction significantly, and Peirce scholars often make a distinction between Peirce's pre- and post-1903 construals of abduction (e.g. Ma and Pietarinen 2018; Chiffi and Pietarinen 2019). In one of these post-1903 definitions, Peirce gave the following revised formulation of what abduction means:

The surprising fact, C, is observed; [cf. Result]
 But if A were true, C would be a matter of course, [cf. Rule]
 Hence, there is reason to suspect that A is true. [cf. Case] (CP 5.189)

Although this formulation obviously follows the sentential form of the earlier example, the substance of the sentences already points towards an understanding of abduction as a matter of discovery rather than evidencing (Burks 1946; Fann 1970; Anderson 1986). Here the part 'there is reason to suspect' already introduces abduction as a practical logic of scientific discovery.

However, the evolution of Peirce's thinking becomes even clearer through a quote from roughly the same time period. In circa 1905, Peirce characterised abduction as one of three "elementary modes of reasoning" (CP 8.209) in the following manner:

The first, which I call *abduction* [...] consists in examining a mass of facts and in allowing these facts to suggest a theory. In this way we gain new ideas; but there is no force in the reasoning. The second kind of reasoning is *deduction*, or necessary reasoning. It is applicable only to an ideal state of things, or to a state of things in so far as it may conform to an ideal. It merely gives a new aspect to the premisses. It consists in constructing an image or diagram in accordance with a general precept, in observing in that image certain relations of parts not explicitly laid down in the precept, and in convincing oneself that the same relations

will always occur when that precept is followed out. [...] The third way of reasoning is *induction*, or experimental research. Its procedure is this. Abduction having suggested a theory, we employ deduction to deduce from that ideal theory a promiscuous variety of consequences to the effect that if we perform certain acts, we shall find ourselves confronted with certain experiences. We then proceed to try these experiments, and if the predictions of the theory are verified, we have a proportionate confidence that the experiments that remain to be tried will confirm the theory. (CP 8.209, emphases original)

In this definition, abduction is essentially conceptualised in terms of scientific methodology rather than as a simple inferential schema or logical form (c.f. Paavola 2005). Although the description bears striking similarity with how New Archaeology conceptualised the deduction of test-implications from a hypothesis (see Article 4, p. 24) the crucial difference is that, whereas the H-D model denotes an adherence to a particular logical schema, abductive inference does not follow one. Most importantly, then, this methodological definition highlights that, in the process of inference, abduction is the phase that introduces new ideas so that they can in some cases, but not necessarily all, be subjected to the test of experimentation and experience (Article 3).

More importantly, however, Peirce's post-1903 understanding of abduction takes abductive inferences as questions pertaining to the interests of the inquirer, and experimentation entails the use of abductive inferences as lures for novel observations, or as Ahti-Veikko Pietarinen (2019) contends,

abductive conclusions are requests to Nature to act in a certain way in certain kinds of circumstances, so that the skilful manipulators (the experimenters) would become in a position to gain important pieces of information as part of their *yes–no*-interrogation strategies. (Pietarinen 2019, 256, emphasis original)

Importantly, then, abduction becomes an 'interrogative mood', a feeling that the answer to the question might be important for the interests of the inquirer and that therefore the possibility that a hypothesis is true should be further investigated, resulting in the illocutionary conclusion 'Let's investigate!' (Ma and Pietarinen 2018; Chiffi and Pietarinen 2019). In other words, if IBE suggests possible hypotheses (and possibly even criteria for their evaluation), the purpose of abduction is to intensify the *feeling* that a particular hypothesis deserves further attention. In its revised form, then, Peirce's abduction fulfils the requirements set by both Hintikka (1998) and Shelley (1996). Peirce's revised definitions pertain to Shelley's requirements by framing abduction as a logic of practice instead of form, and they satisfy Hintikka's view of abduction as an interrogative method in seeing abduction as a logic of asking questions rather than providing the conditions for conclusions (c.f. Pietarinen 2019).

Although Shelley's (1996, 279) straightforward dismissal of Peirce's understanding of abduction as sentential is somewhat of an oversight, Shelley nevertheless makes a point in showing how deeply non-language-like

archaeological reasoning can be. One of Shelley's (1996, 284) main points in elaborating on the non-sentential nature of inference is that explanations regarding the production of an archaeological object, for instance, are partly dependent on the possibility of being able to form a mental visualisation of the causal history of the object's production. Shelley (1996, 284–285) uses stone tool production as an example of how visual abduction works. From the flake material found at an archaeological site, archaeologists familiar with the procedure of making a stone tool experimentally are able to infer causal reasons for certain traits in the flake material. Shelley gives an example of flake material that consisted of what the archaeologists called right-hand and left-hand flakes in a ratio of 57 to 43 percent, respectively. According to Shelley, a visual thought experiment on how the tool maker would rotate the cobble between blows led the archaeologists to infer that the flakes had been produced by a right-handed tool maker. This hypothesis was later corroborated by an experimental production of a similar tool that resulted in a 56 to 44 percent ratio between right-hand and left-hand flakes.

Shelley's article remains a somewhat isolated incident in the epistemology of archaeology. In addition to being one of the few to have dealt with abduction in archaeology explicitly, Shelley is also one of the few that makes a clear distinction between abduction and IBE (see, however, Fogelin 2007). The more common alternative has been to confuse between the two in varying degrees (e.g. Hanen and Kelley 1989). Therefore, rather than inventing logical criteria for how the best explanation is selected from a collection of plausible or possible explanations, Shelley's article provides a convincing description of how new ideas and new explanations are born in archaeology. Furthermore, Shelley's article underscores the visual and embodied aspects of discovery and knowledge production and emphasises that subconscious visual abductions "may be very significant and lead to interesting new discoveries" (Magnani 2004, 227. Magnani also refers to Shelley in this respect. See also Paavola 2011. For further references to visuality in archaeology in the sense discussed here, see, for example, Jones 2001; Moser 2012; Jones et al. 2015).

12. A typology of archaeological inference

As became evident from the examples discussed in the above rundown of the history of the epistemology of archaeology, the fundamentals of the formation of archaeological knowledge have been conceptualised in terms of induction, deduction, and abduction. From the above presentation of the common conceptualisations of the method of archaeological inference it is, then, unsurprisingly, possible to identify **three main groups: (1) the inductivists, (2) the deductivists, and (3) the abductivists**. Each group is further dividable into two subgroups, a critical and a naive position, resulting in a total of six groups. Although the following typology to some extent reflects the chronological history of archaeology from induction to deduction and abduction, the division is not tied to any particular time or

place, and the grouping should be seen foremost as a summary of the aspects discussed above.

Subgroup 1a. The first group, generally referred to as **naive inductivists**, consists of those empiricist archaeologists who see archaeological inference as inherently inductive. In this context, induction denotes a certain conceptualisation of inference as ‘theory-free’, followed by the empiricist conviction that through careful collecting a complete image of the past will eventually emerge. In other words, the objective of naive inductivists is to replace speculative hypotheses with secure inductions. In this sense, the form of inference in this first group could be termed ‘inference to the inevitable explanation’. Contrary to the empiricist objectives of the group, its inductivism can ultimately lead to skepticism, subjectivism, and idealism. This is a large group consisting mostly of traditional archaeologists as well as archaeologists who see the practice of archaeology as theory-free. Notable members include, for example, Sophus Müller, Oscar Montelius, and Julius Ailio. Note that the term naive in this context is not used as a pejorative term, but should instead be taken as a reference to the kind of empiricist attitude promoted in this thesis.

Subgroup 1b. The second subgroup of inductivist archaeologists, here dubbed as **critical inductivists**, emerged with the decline of New Archaeology. Instead of adopting a view of the logic of archaeology as a formal logical system, as was common in New Archaeology, archaeological inference, and therefore the formation of new knowledge, is here seen as the combination of inductive generalisations. Especially those who see IBE and analogical thinking as instances of inductive inference belong to this group. Critical inductivism is common in archaeology. Notable authors include Leroy Johnson, Jane Kelley, Marsha Hanen, Alison Wylie, Lars Fogelin, as well as later Binford and other ‘serutan’ (that is, processual) archaeologists. Inductivism of this sort also contains an aspect of phenomenology, mainly through the works of Alison Wylie.

Subgroup 2a. The first deductivist subgroup can be referred to as **naive deductivists**. The epistemology of this group is characterised by its connection to logical positivism and logical empiricism, naturalism, and evolutionism. Induction is seen by naive deductivists as a subjective generalisation that should be subjected to testing. This is the ‘law-and-order’ type of New Archaeology that stressed the hypothetico-deductive method in the testing of hypotheses, and the term ‘naive’ in this context is used to call into question whether the adoption of deductivism over inductivism really resulted in any lesser degrees of theoretical naivety. The lifespan of this group was not long due to the criticism from the critical inductivists in the early 1970s. Regardless of its short existence, this group had quite a few members, most notably early Binford. Note that those who see deductive explanation as a matter of statistics naturally belong to the group of critical inductivists.

Subgroup 2b. The second subgroup of deductivists can be called **critical deductivists**. Deductivists of this type see deduction as a matter of subjectivism rather than as a strategy leading to increased objectivity. Most notably, critical deductivists consider observations as intimately theory-laden, and for this reason this group shares striking similarity with the critical inductivists. This group, however, falls in the deductivist category mainly by influence of Arne B. Johansen and, although many of its other members do not use the word deduction, the epistemology of this group is characterised by its centralisation of theory over data. Due to its centralisation of theoretical frameworks as inescapable, this group also encompasses the various rationalist, idealist, solipsist, relativist, and social constructionist forms of interpretive archaeology. Therefore, this type of deductivism is widespread in archaeology outside explicit epistemological treatments, and the list of members is extensive.

Subgroup 3a. The first subgroup of abductivists, or what might be termed **critical abductivists**, is basically an abductivist version of critical inductivism (1b). Whereas critical inductivism sees the combination of inductive inferences as a matter of inductive generalisation (i.e. cabling), critical abductivism sees it as an instance of abductive inference. Therefore, for critical abductivists, also IBE and analogous thinking are instances of abductive rather than inductive inference. Furthermore, although the members of this group view hypothesis creation as abductive, they do not necessarily consider abduction as part of logic, and therefore separate abduction from induction and deduction as a matter of psychology. This type of abductivism is not widely adopted in archaeology. Members include, for example, Leo Klejn and Fred Plog. Some critical inductivists could be seen to belong to this group.

Subgroup 3b. The second abductivist subgroup, or what could be called **naïve abductivists** due to their strong empiricist devotion, consists of those who see the creation rather than the combining of hypotheses as the main task of abduction and who, furthermore, consider abduction intimately connected to logic rather than being simply a matter of psychology. By this token, the members of this group include perception and tacit or bodily forms of knowledge as elemental to logic. Members include Michael Shanks, Cameron Shelley, and, to some extent, the author himself (Articles 1 and 3). Note again that the term naïve is not a pejorative term, but rather denotes a kind of speculative attitude towards the empirical. For this reason, the group could also be termed **speculative abductivists**.

Although these six groups have very different ideas of how archaeological knowledge is developed from hypotheses to more secure forms of knowing, they all share two important and deeply entangled points of connection that are also part of the reason for the difficulties in conceptualising the process of archaeological knowledge production. Firstly, all of the above sketched epistemologies treat induction, deduction, and abduction as more or less

distinct operations. In addition to conflating between two meanings of the term deduction, it has, more importantly, been particularly challenging in archaeological theorising to clearly define abduction and induction in ways that would allow us to identify to what extent archaeological theories are result of induction, and to what extent hypotheses can be seen to resist the different eliminationist strategies and remain abductive. The clear distinction between hypothesis creation as a matter of psychology and hypothesis testing as a matter of inference in particular has tended to conceal the ambiguities involved in speculation rather than resolve them. In this respect, the above discussed distinction between abduction as sentential and abduction as methodological in particular is an important clarification that helps us to analyse the possible reasons for the difficulties in conceptualising the nature of archaeological inference. In particular, it highlights that matters of psychology and phenomenology phase into matters of logic.

This leads us to the second point. All groups treat abduction (or hypothesis) as a provisional resort. In this sense, all of the above sketched six groups share a certain eliminationist idea that speculative hypotheses can and should be controlled and gradually eliminated by recourse to deductive or inductive selection and testing. For the naive inductivists (1a), the common strategy of elimination is collecting of data, whereas critical inductivists (1b) and critical abductivists (3a) hold that a hypothesis can be made more reliable (or a generalisation more justifiable) through the combination of hypotheses with relatively narrower applicability. The naive deductivists (2a) mainly see that all hypotheses fall equally outside the scope of logic until they go through a deductive process of selection and testing, and that a deductive conclusion should not hinge on untested or untestable hypotheses. The critical deductivist (2b), on the other hand, contends that all evidence is identified as evidence according to pre-existing theoretical frameworks to begin with, and that the invention of theories and concepts rather than the discovery of evidence is what can lead to new knowledge. This position shares many qualities with that of naive or speculative abductivism (3b). Although critical deductivists and naive or speculative abductivists are separated by the degree to which they emphasise existing theoretical frameworks, both hold that existing ideas are revised by theoretical reflection as much as they are affected by observation of new facts.⁴⁶

In order to further clarify how these groups have distinguished between different inferential modes, and to show how, by all groups, hypotheses have been considered as subject to elimination, I have selected two further quotes from Peirce. Ironically, as part of his 1878 syllogistic formulations of abduction, Peirce also gives the most lucid definition of the difference—or, rather, the connection—between induction and abduction:

The great difference between induction and hypothesis [i.e. abduction] is, that the former infers the existence of phenomena such as we have

⁴⁶ Fast forward to the very end of Chapter 15 in Part Four for a quick answer to what I think could be added as a seventh group to the sixfold typology of archaeological inference.

observed in cases which are similar, while hypothesis [i.e. abduction] supposes something of a different kind from what we have directly observed, and frequently something which it would be impossible for us to observe directly. Accordingly, when we stretch an induction quite beyond the limits of our observation, the inference partakes of the nature of hypothesis [i.e. abduction]. It would be absurd to say that we have no inductive warrant for a generalization extending a little beyond the limits of experience, and there is no line to be drawn beyond which we cannot push our inference; only it becomes weaker the further it is pushed. Yet, if an induction be pushed very far, we cannot give it much credence unless we find that such an extension explains some fact which we can and do observe. Here, then, we have a kind of mixture of induction and hypothesis [i.e. abduction] supporting one another. (CP 2.640)

The above quote highlights that there is no clear demarcation between induction as evidential and abduction as speculative, but instead that induction also contains a speculative element. Both are connected to observation, and the nature of this connection is not a matter of kind but of degree. With this realisation in mind, the above quote also highlights that there is not much difference between conceptualising the combination of observations as inductive (as in 1b) or as abductive (as in 3a), and that the difference between abduction and induction in this case is more of a terminological nature. Whereas inductivists see ampliative knowledge as a matter of induction, abductivists take it as abductive.

For clearer future use of the terms, in reference to their meaning in the process of evidencing, the term induction should be reserved for the operation of inferring “from one set of facts another set of similar facts”, whereas the term abduction should be used when inferring “from facts of one kind to facts of another” (CP 2.642). In the following quote, Peirce discusses this distinction further.

Hypotheses [abductions] are sometimes regarded as provisional resorts, which in the progress of science are to be replaced by inductions. But this is a false view of the subject. Hypothetic [abductive] reasoning infers very frequently a fact not capable of direct observation. It is an hypothesis [abduction] that Napoleon Bonaparte once existed. How is that hypothesis [abduction] ever to be replaced by an induction? It may be said that from the premiss that such facts as we have observed are as they would be if Napoleon existed, we are to infer by induction that *all* facts that are hereafter to be observed will be of the same character. There is no doubt that every hypothetic [abductive] inference may be distorted into the appearance of an induction in this way. But the essence of an induction is that it infers from one set of facts another set of similar facts, whereas hypothesis [abduction] infers from facts of one kind to facts of another. Now, the facts which serve as grounds for our belief in the historic reality of Napoleon are not by any means necessarily the only kind of facts which are explained by his existence.

It may be that, at the time of his career, events were being recorded in some way not now dreamed of, that some ingenious creature on a neighboring planet was photographing the earth, and that these pictures on a sufficiently large scale may some time come into our possession, or that some mirror upon a distant star will, when the light reaches it, reflect the whole story back to earth. Never mind how improbable these suppositions are; everything which happens is infinitely improbable. I am not saying that *these* things are likely to occur, but that *some* effect of Napoleon's existence which now seems impossible is certain nevertheless to be brought about. (CP 2.642, emphases original)

Through this rather imaginative example, Peirce demonstrates how the stability of a hypothesis might make it look like an induction whereas it is actually an abduction. This goes to demonstrate that the simple distinction between speculative hypotheses and those operations that aim at the cementation of a hypothesis into a belief may not work in favour of the eliminationist objectives. A hypothesis may simply be distorted in ways that make it appear as an induction. In this respect, the task of hypothesis is to resist the strategies of elimination by reminding us of the fact that evidence "which now seems impossible is certain nevertheless to be brought about" (CP 2.642). Just like there is no clear distinction between hypothesis formation and hypothesis testing, there is no clear separation between observation and anticipation. The relationship between abduction and induction boils down to the metaphorical distance between observation and anticipation. As becomes evident in the case provided by Peirce, the hypothesis that Napoleon once existed is not a matter of observation, but of anticipation of observation, however remote.

...

In this part, I have aimed to outline some common ways of conceptualising the nature of archaeological inference. The discussed examples are necessarily selective, but they nevertheless highlight that no one model has been able to sufficiently convey the multifaceted nature of what we refer to as archaeological inference. This is mostly result of the efforts to see hypotheses as provisional resorts that should not be adopted as part of the body of knowledge until they have been tested against a known body of evidence and verified or falsified. In this respect, Peirce's later view, in which abduction is the logical operation that leads to new hypotheses and not the evidencing process that aims to fix an abduction by way of induction, was central for our analysis of the common modes of archaeological inference.

Whereas this part discussed the common consideration of inference as the procedure consisting of creating, comparing, verifying and falsifying hypotheses, the next part is a clear departure from these concerns. Instead of conceptualising inference as an evidencing process, the next part argues that

the equally important task of inference is to resist the commonly employed strategies of hypothesis elimination and belief cementation. In this sense, special effort is made to highlight hypothesis, abductive inference, and, more importantly, speculation as forms of future anticipation and future creation.

PART FOUR—FOR A SPECULATIVE EPISTEMOLOGY OF ARCHAEOLOGY

If relevance rather than authority or objectivity had been the name of the game, the sciences would have meant adventure, not conquest. (Stengers 2018, 144)

13. Speculation and the aim of inquiry

In Part Two, we learned that the materials of archaeology follow a certain open-ended aesthetic speculative logic. The nature of this logic was chiefly discussed in terms of the concept of transduction which is the common mode of the type of creative and emergent material logic that gives rise to new entities and therefore new ideas as well. In Part Three we saw that the views of logic commonly adopted in archaeology have not necessarily been able to follow the aesthetic logic of its materials and that, as result of this relative failure, recent new materialist archaeological thinking (with loose reference to OOO and speculative realism as philosophical inspiration as well) has tended to engage in a type of ontological rather than epistemological theorising, as became evident in Part One and Part Two. Although, in new materialist archaeological theory, ontology denotes a kind of descriptive philosophy that aims to remain sensitive to the underdeterminacy of the causes behind particular observed effects by centralising aesthetics and by resisting the established forms of archaeological categorisation and sense-making, it nevertheless remains unclear whether the descriptive approach is as ontologically sensitive as it aspires to be.

The aim of this part, then, is twofold. On the one hand, based on the historical considerations presented in Part Three, this part aims to formulate an epistemology of archaeology in a way that remains faithful to the ontological considerations presented in Part Two. On the other hand, in order to mediate between empiricism and speculation, the part aims to discuss the possible implications or consequences—and benefits—of an ontologically sensitive idea of epistemology. I will begin by discussing what I see as the common objectives of science, how these objectives have been thought to be achievable through a systematic methodology of archaeology, and how in fact a more open-ended conceptualisation of the epistemological system will be better suited to account for the type of ontological underdetermination of interpretation discussed in Part Two (c.f. Alberti and Marshall 2009). In particular, then, the part will argue that the empirically sensitive and ontologically responsible form of speculation is not theory-free observation, but anticipation of observation in the most diverse meaning of the term. In epistemological terms, this means that the real, as it is understood in

traditional realism, is insufficient as the measure of truth. Instead, speculation as a form of anticipation denotes an ethical disposition towards the real, and inference as an intellectual process entails a position aimed towards the common good rather than the ideal real. I will therefore also argue that, in order to make anticipation meaningful for the common good and in order to make it relevant beyond the above discussed strategies of the elimination of speculation in the epistemology of archaeology, a sense of hesitation is needed. This hesitation is discussed in terms of a disciplinary deceleration. Deceleration, or slowing down, then, is seen as synonymous with systematic open-endedness. Because the history of archaeology is also a history of methodological acceleration, the part makes special reference to the relationship between natural sciences and humanities in archaeology. In other words, it is argued that through deceleration, and by caring for speculation, the future of archaeology will see a more intimate convergence of the two fields.

...

As already mentioned, it is unclear whether the new empiricist and new materialist archaeological theory has succeeded in establishing itself as the ontologically sensitive philosophy of archaeology it has aspired to be. In fact, the whole project of anticorrelationist speculative philosophy has been heavily criticised as a dark philosophy that is at best a dystopian description (i.e. not a solution) of the end times ruled by inanimate automatons and conceptual disarray (Wolfendale 2014; Hornborg 2017). The topic has also been discussed in archaeology (Ion 2018; Pétursdóttir 2018). Part of the problem for some is that speculative philosophy appears as the systematic philosophy that it is critical of in the first place. Artur Ribeiro (2019), for instance, argues that the objective of, in his case, new materialisms is plagued by a logical fallacy. In Ribeiro's view, new materialisms, and speculative philosophies in general, aim to provide descriptions of a reality that is nevertheless supposed to remain withdrawn and unknowable. In other words, a speculative philosophy can never claim that it is a better account of the unknowable than another speculative philosophy. This incoherence, Ribeiro contends, undermines the whole purpose of speculative philosophy, the aim of which is to stay speculative in respect to the withdrawn. The biggest shortcoming of new materialisms in Ribeiro's view is that, because new materialist philosophies focus on metaphysical speculation rather than on those knowledge systems that are supposed to represent those phenomena, they tell us nothing of how empirical research is supposed to be conducted. At best, as argued by Ribeiro, metaphysical speculation targets the non-empirical in ways that have nothing to do with archaeology as an empirical science, and that speculative philosophy has therefore no real applicability in archaeology as a social science (cf. Campbell et al. 2019). Similar arguments about the role of metaphysics as part of the philosophy of science are wide-spread in archaeology (e.g. Watson 1973; 1991; Flannery 1982). In arguing the above, Ribeiro (2019) misses two

important points of speculative philosophy. Firstly, in arguing that speculative philosophies undermine their own objective of remaining systemically open-ended by constructing ontological systems in form of speculative description, Ribeiro makes the common mistake of confusing between form and contents. In other words, systematic open-endedness is not a form of closed system just because open-endedness is suggested as a systematic philosophy. Just like tolerance does not entail tolerance of intolerance (this would be the formalist conclusion), but is rather a consideration of the effects of intolerance (this would be the pragmatic conclusion), systematic open-endedness entails a systematic separation between the destructive and constructive effects of being systematic. In other words, what speculative philosophy in general states is that we should keep our epistemological systems open so as to not be limited by them empirically.

In his second argument, namely that ontological speculation is non-empirical and therefore not a fitting description of how empirical research should be conducted, Ribeiro raises a more important question. Although it remains questionable whether science should follow any predetermined methodological guidelines that allow us to decipher the superiority of one theory, generalisation, or explanation over another, as implied by Ribeiro (2019), his point touches on some of the central shortcomings of new materialisms as a model for the epistemology of archaeology. If assessed as a type of realist epistemology, it is clear that the ontological description of what reality is like 'behind' the 'for us' appears deeply conflicted. Ribeiro's (2019, 33) alternative to a new materialist speculative philosophy, then, is a type of realism based on mutually accepted conceptions of what counts as real. Realism, to Ribeiro, is not an ontology that makes claims about the mind-independent and unknowable existence of an entity, but instead an epistemology based on an agreement as to the meaning of the term real. In this way, Ribeiro's realism becomes a literalist epistemology, meaning that the reality of an entity is dependent on the commonly agreed meaning of a statement (cf. Gallie 1956; Lucas 2019, 123, 130). This, in turn, renders realism a matter of common sense. In common sense realism, the meaning of the real is determined by the meaning of a true statement. Practically, the type of common sense realism called for by Ribeiro is a way of bringing back to archaeology a sense of good old empiricism that does not regard metaphysical claims as prerequisite for empirical claims (see also Ribeiro 2016).

At the same time, however, one wonders whether the literalism of Ribeiro's empiricism makes it an ally of positivism. Ribeiro's distinction between ontology and epistemology is based on the idea that ontology is necessarily speculative while epistemology is not and that, at the end of the hypothetical day, epistemology will be stripped of any speculative considerations. I follow this sentiment only partly. I take ontology as a speculative concept to serve as a starting place for a countermovement to the kind of positivist epistemology that takes the real as epistemologically exhaustible. In this sense, ontology is an epistemological term, but only designed to refer to the emergent potency of the empirical. We can therefore replace the term 'ontology' with the term

‘speculative epistemology’ which, in this context, would be an attempt to avoid the danger of falling into social constructionist, correspondence theoretic, or representativist conceptions of the real, and an attempt to make possibility ontologically real. This is simply a way of balancing between rationalism and empiricism by making the claim that the real is always more real than traditional empiricist and positivist epistemologies, or old materialism for that matter, suggest (c.f. Moffat 2019).⁴⁷

Interestingly, David Clarke has argued for the epistemological relevance of metaphysical speculation in archaeology by contending that

every archaeologist has thoughtfully or unthinkingly chosen to use concepts of a certain kind—thus committing himself to a metaphysical position, restricting himself to certain paradigms, to use certain methodologies, to accept certain modes of explanation and to pursue certain aims. (Clarke 1973, 12)

Metaphysics, for Clarke, then, is the invention of conceptual systems, and the practical objective of metaphysical reflection is the realisation that “unknowing devotion to one metaphysical system prevents the recognition of those of other archaeologists” (Clarke 1973, 12–13). Clarke (1973, 14) then concludes that “fundamental speculation at this level is exceedingly important if only because the more fundamental the metaphysical controlling model, the less we are normally inclined to rethink it” (see, also, Klejn 2001, 7–8 for a discussion of Clarke’s classifications of theoretical archaeology).

These concerns about the relationship between metaphysics and epistemology and their relevance for each other highlight an important aspect about the new materialisms. Unlike many critics of new materialisms claim, new materialisms are as much concerned about the immaterial as they are about the material (Lemke 2017). In this context it should also be noted that Harman (2016), for instance, explicitly distances his object-oriented speculative realism from the new materialisms by stating that their relationality tends to leave no room for the immaterial. Harman then explicitly refers to his position as a form of immaterialism. In other words, although speculative realism and the new materialisms are extremely widespread doctrines, and therefore at times almost indistinguishable, constant vigilance is called for when using these terms. Nevertheless, what both speculative realism and new materialisms aspire to teach us is not simply that the real comprises both material and immaterial things that exist independent of our thinking them (this is what the old realism taught us), but instead that those things exist in ways that are much weirder than the real of traditional empiricism (Harman 2012b, 184). The result is “a *weird* realism in which real individual objects resist all forms of causal or cognitive mastery” (Harman 2012b, 188, emphasis original). Simultaneously, one should also remember that this weird realism is also inherently empiricist in its speculations, perhaps akin to what Danilyn Rutherford (2012; c.f. 2016) calls ‘kinky empiricism’,

⁴⁷ See, also, Wolfe (2017) for the misunderstandings between old and new materialisms.

[a]n empiricism that admits that one never gets to the bottom of things, yet also accepts and even celebrates the disavowals required of us given a world that forces us to act. An empiricism that is ethical because its methods create obligations, obligations that compel those who seek knowledge to put themselves on the line by making truth claims that they know will intervene within the settings and among the people they describe. (Rutherford 2012, 465)

Both the material and the immaterial and the ontological and the epistemological, then, are saturated by a sense of anticipation and unfinishedness, and an empathetic sense of care for the unfinished. In this way, speculation is not simply speculation into the unobservable and the transcendent, but instead a pragmatic and an empiricist wager on the “unfinishedness of the present” (Savransky 2017); a wager on what might be. This wager is motivated by the idea that, through the creation of concepts, theories, and speculations, we pragmatically contribute to the creation of the actual world around us, however unrealised or latent the effects of those epistemological activities may be:

Thus, a speculative proposition becomes ‘true’ to the extent that it succeeds in infecting its environment while allowing itself to become infected by it. Indeed, it seems to me that the ‘truth’ of a proposition is nowhere to be found if not in the very process whereby a proposition and its world begin, little by little, drop by drop, to respond to each other. What, at the end of the day, deserves to be called ‘true’, is the event of the future experience that such an exchange has enabled to come into existence. (Savransky 2017, 36)

With this detour into the quarrel between ontology and epistemology we can return to the place of common sense in the matter. While I am deeply sympathetic with the type of common sense realism promoted by Ribeiro, I remain reserved as to whether it really can be adopted as the type of scientific epistemology Ribeiro himself criticises new materialisms falling short of (see also Article 1). It was argued in Part Two and Part Three that, in order to stay open to the unexpectedness and weirdness of the subject matter of archaeology, the epistemic systems adopted in archaeology should be kept open-ended. In other words, it was suggested that archaeologists should adopt a radically empiricist attitude. An important question then is whether this epistemological open-endedness sets us back in the old empiricism of traditional archaeology with its shortcomings. In other words, if we adopt a common sense approach, are we thrown back to some form of essentialism (Dunnell 1982; 1992, 84–86), or perhaps a kind of skeptic idealism that identifies between observation and existence (see also Article 5)?⁴⁸ If the

⁴⁸ Consider Peirce’s description of common sense realism: “Take, for instance, that superlatively cunning defense of common sense, the doctrine of immediate perception,—a doctrine so subtle that it has eluded the grasp of many a fine logician,—and what is it, after all, but a confession that to see and to be seen are one and the same fact.” (CP 7.561n)

answer to that question is affirmative, then how should we frame the type of empiricism that would allow us to stay open to the real on its own terms rather than as subordinate to the existing epistemic categories?

If, as seems necessary, we set out to treat common sense as a form of empirical and realist philosophy, we should distinguish between at least two types of common sense; constructionist common sense and critical common sense (a concept I promoted in Article 1 in reference to Peirce). While both forms of common sense denote a degree of mutual agreement as to the nature of truth and reality, they are separated in one important respect. In order to clarify this distinction, we will again resort to the writings of Peirce, but through a very fundamental question about the ultimate aim of scientific inquiry (see also Articles 1 and 2). In his 1877 *The fixation of belief*, Peirce writes that the sole purpose of research, or what he refers to as inquiry, is to reach a state of belief:

The irritation of doubt causes a struggle to attain a state of belief. I shall term this struggle inquiry, though it must be admitted that this is sometimes not a very apt designation. [...] With the doubt, therefore, the struggle begins, and with the cessation of doubt it ends. Hence the sole object of inquiry is the settlement of opinion. (EP 1, 114–115).

In identifying the possible pitfalls of this endeavour, Peirce is very explicit that, in the struggle to attain a state of belief, the scientist must remain aware of those methods of inquiry that can provide a false sense of settlement of opinion. Peirce then identifies three methods that can lead to a false sense of settlement; (1) the method of tenacity (fixation of individual belief by resisting alternative views dogmatically), (2) the method of authority (fixation of belief by institutional power or social and hierarchical authority), and (3) the a priori method (fixation of belief by human reason, meaning also that ideas may appear clear without being so). These methods would provide only a temporary sense of fixation of belief and therefore they would ultimately put an end to inquiry on false grounds (Article 1).⁴⁹

In his solution to the problem, Peirce formulates a fourth method that he calls the scientific method. Whereas the three aforementioned methods take as their purpose the settlement of opinion by recourse to individual or social agreement, the scientific method seeks for external permanency, something upon which our thinking has no effect. This external permanency would be something that affects, or would affect, everyone, and although these effects are necessarily as various as are individual conditions, the method should be such that the ultimate conclusion of everyone shall be the same. Peirce contends that, “[t]o satisfy our doubts, therefore, it is necessary that a method should be found by which our beliefs may be caused by nothing human, but by some external permanency” (EP 1, 120). Although Peirce sees that the scientific method is the one to follow, he does admit that the three non-

⁴⁹ “It is certainly important to know how to make our ideas clear, but they may be ever so clear without being true.” (EP 1, 141)

scientific methods all have advantages (EP 1, 121–122). The a priori method is appealing because it offers “comfortable conclusions”. The method of authority is the only one that will lead to peace because it appeals to masses and “forbids unsafe non-conformities”. The method of tenacity, on the other hand, can be admired for its “strength, simplicity, and directness”. Therefore, the method of tenacity can offer a way to make up our minds and stay true to an adopted position no matter what is thrown our way.⁵⁰ From the viewpoint of the four methods listed above, there is a sense in which the concept of common sense might end up satisfying only the former three. If by common sense we refer to our established thinking habits, the first three methods would represent constructionist common-sensism. Furthermore, the type of common sense realism outlined above in reference to Ribeiro (2019) is also represented in the first three methods.

Peirce made every effort to distinguish his position from constructionist understandings of common sense. In order to highlight the dangers of the three dubious methods, Peirce distinguished his understanding of pragmatism as a method of inquiry from that of his contemporaries and decided to call his approach ‘pragmaticism’, a word “ugly enough to be safe from kidnappers” (CP 5.414; Article 1). In doing so, Peirce wanted to expand from his earlier pragmatic maxim “Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object” (CP 5.402) to seeing pragmaticism as a more careful consideration of the “general habits of conduct a belief in the truth of the concept (of any conceivable subject, and under any conceivable circumstances) would reasonably develop; that is to say, what habits would ultimately result from a sufficient consideration of such truth” (CP 6.481). In other words, Peirce wanted to distance his version of pragmatism from the individualist humanism of F.C.S. Schiller and from the social constructionism of William James, and he believed that the pragmatisms of his contemporaries would only lead to subjectivism (Scott 1973; Liebhaufsky 1986; Anderson 2009; Poggiani 2012). Whereas a subjectivist would contend that the truth of a proposition is dictated by a logical feeling in the reasoner’s mind (cessation of doubt), or by the practical effects of adopting a belief, Peirce’s pragmaticism ultimately aims to preserve the logical feeling of doubt. Peirce then states that,

if Truth consists in satisfaction, it cannot be any actual satisfaction, but must be the satisfaction which would ultimately be found if the inquiry were pushed to its ultimate and indefeasible issue. This, I beg to point out, is a very different position from that of Mr. Schiller and the pragmatists of today. (CP 6.485)

In this sense, common sense realism is closer to the subjectivist position rather than what Peirce takes as the scientific method. According to Peirce, common

⁵⁰ “Still oftener, the instinctive dislike of an undecided state of mind, exaggerated into a vague dread of doubt, makes men cling spasmodically to the views they already take.” (EP 1, 116)

sense denotes the idea that there are certain propositions that are taken as true (EP 2, 432–433), and although these ‘indubitable’ propositions have instrumental value, they do not belong to science, whose duty is to criticise common sense and correct it (hence his pragmatism). In other words, the second type of common-sensism that Peirce outlined as critical common-sensism is in line with his conception of the scientific method.

But what is the nature of realism in critical common-sensism? In his 1905 *Issues of pragmatism*, Peirce (EP 2, 346–359) writes that critical common-sensism is marked by its realism. Again, one must distinguish this pragmatistic notion of realism from the common sense realist conviction that the real is determined by the literal meaning of ‘true’, as well as from the conviction of scientific realism according to which the real is a collection of objects and laws that govern their movement. For Peirce, the realism of critical common-sensism differs from these narrow definitions of realism by positing (in congruence with his revised maxim of pragmatism) that, in addition to real individuals and real generalities, the mind-independent real includes real possibilities:

[Realism] is usually defined as the opinion that there are real objects that are general, among the number being the modes of determination of existent singulars, if, indeed, these be not the only such objects. But the belief in this can hardly escape being accompanied by the acknowledgment that there are, besides, real *vagues* [i.e. undetermined generals], and especially real *possibilities*. For possibility being the denial of a necessity, which is a kind of generality, is vague like any other contradiction of a general. Indeed, it is the reality of some possibilities that pragmatism is most concerned to insist upon. (EP 2, 354, emphases original)

In this sense, possibility is an ontological rather than an epistemological notion and, in arguing the above, Peirce adopts an unusual understanding of the real. Suddenly the real has no external permanency, propositional or actual, but is permeated by the notion of possibility and, by extension, contingency.

Naturally, Peirce’s notion of possibility and contingency as ontologically necessary also requires an epistemological equivalent. For Peirce, doubt becomes this epistemological necessity, and at the same time it becomes evident that fixation of belief (or truth) becomes an approximate value that can never be reached. This notion becomes most evident through Peirce’s consideration of inquiry in the long-term. If the aim of inquiry is to reach an agreement as to the nature of reality, and if the cessation of doubt might end up satisfying only our contemporary understanding of what is possible, there must be something about reality that remains beyond or resists the satisfaction provided by the fixation of belief. Contrary, then, to what one might predict based on the recent achievements of science, Peirce contends that regardless whether the pursuit of science “were to go on for a million, or a billion, or any

number of years you please” (CP 5.409), it is unsure whether it would ever be possible to reach a conclusion as to the truth of every possible hypothesis.

We cannot be quite sure that the community ever will settle down to an unalterable conclusion upon any given question. Even if they do so for the most part, we have no reason to think the unanimity will be quite complete, nor can we rationally presume any overwhelming consensus of opinion will be reached upon every question. All that we are entitled to assume is in the form of a hope that such conclusion may be substantially reached concerning the particular questions with which our inquiries are busied. (CP 6.610)

Amidst all this dialectic between the unavoidable incompleteness of inquiry and the hope that drives it, Peirce also gives a very practical reason why inquiry might never be brought to conclusion. Peirce contends that some “minute facts of history” or “the lost books of the ancients”, might eventually remain “buried secrets”, “forgotten never to be recovered” (CP 5.409; c.f. Jardine 1986; Misak 1991). In other words, there are questions that remain unanswerable regardless of the fact that we know that the evidence needed for answering those questions once existed and still might exist in forms that are simply irrecoverable with the available methods. Stated differently, truth becomes the real aim of inquiry without being part of it (Misak 1991, 163–164; c.f. Wilson and Brunson 2017): “Inquiry is that which *aims* at truth and truth is that which *would* be the product of inquiry” at the end of the hypothetical day (Misak 1991, 167, my emphases).

The real, in this sense, is always more than permanent, and because possibility is suddenly an ontological rather than solely an epistemological mode of existence, we are quickly moving in the direction of speculative realism and its view of reality as weird, knowledge as indirect, and truth as withdrawn. In other words, to speak of a thing-in-itself is not a claim to ‘know’ that thing (truth), at least not in the sense that knowledge can be understood as ‘justified true belief’. Instead one might, following Harman’s (2018a, 180–181) wordplay, define knowledge as “unjustified true belief” (as when aesthetically orienting towards a real object through sensed qualities when using metaphorical language or allusion = *aesthetics*), or as “justified untrue belief” (as when orienting towards real rather than sensed qualities through literal translation = *knowledge*).

Importantly, this aesthetic understanding of reference also forms a clear counterpoint to the literalism of common sense realism because what we are saying is simply that, for reasons discussed above, reality cannot be reduced to a commonly agreed meaning of a proposition. This results in the notion that knowledge is never about the truth, “not because nothing is real, but because reality is *so* real that any attempt to translate it into literal terms is doomed to failure” (Harman 2018a, 192, emphasis original). In the course of the following lines, this seems evident also to Peirce:

Do [buried secrets] not really exist because they are hopelessly beyond the reach of our knowledge? And then, after the universe is dead (according to the prediction of some scientists), and all life has ceased forever, will not the shock of atoms continue though there will be no mind to know it? (CP 5.409)

This does not mean that we would have to adopt a hopelessly pessimistic view of the possibility of knowledge, and it should be kept in mind that we are talking of truth rather than knowing as the function of the escaping real. In Article 1, I wrote that inquiry is made possible because the human mind is akin to the truth as result of the organism's close coevolution with the universe. However, I was not sufficiently clear in the article that, regardless of this coevolution and the resulting metaphysical connection between the human mind and her surroundings, knowing occupies a space somewhere between being fully ignorant and knowing the truth. In other words, truth as the aim of inquiry is never actualised because reality is inexhaustible and irreducible to any one part of it, such as an organism's perception of her/its surroundings, regardless of their coevolution. By this token, inquiry is not motivated by truth but by love of truth, and the real becomes a matter of perpetual 'anticipation' of truth rather than truth consisting of an external permanence that can be used as a touchstone of truth and validity:

Science is defined in the dictionaries as systematized knowledge. But considered as one of the elements of the life of civilization science is not so much characterized by knowledge as by a resolute desire to know. Science to be a live thing must be growing; and to grow it must be animated with the spirit of inquiry; and the most essential element of the spirit of inquiry is a swiftness to see that you have been in the wrong. (MS [R] 86o)⁵¹

The view of knowledge expressed here will become clearer when I turn to discussing knowledge as a matter of concerns rather than a matter of facts in the next chapter.

14. Epistemological systems and thinking otherwise

At this point it has become evident that the truth of a hypothesis—and therefore the validity of an epistemological system—cannot be evaluated against the real as consisting of an external permanence. In Part Three, I argued that the common conceptualisations of the epistemology of archaeology have treated speculation as a point of elimination because they take the real past to be a finite collection of permanent and knowable objects. Following this notion, I also argued that the epistemology of archaeology is characterised by different eliminationist strategies. I suggested that

⁵¹ Consider also the following statement from Whitehead (1956, 22): "Panic of error is the death of progress; and love of truth is its safeguard."

archaeologists have postulated a variety of ontological and epistemological superstructures such as culture, evolution, logic, or mind, and that all of these are aimed at the gradual reduction of speculation and uncertainty. Throughout the remaining of this part, I want to further develop the idea that was introduced in Article 5. This is the idea that speculation is not simply food for proof or falsification. Instead, I want to show that speculation is an epistemological and ontological force of creation that should be cared for. This is to say that instead of thinking of speculative propositions as possibly true or wrong, we should think of them as a collection of possible futures, however remote (c.f. Latour 1999). By this notion, we are also entering the realm of ethics, and I will later return to this issue by considering speculation as a method aimed at the preservation of the multiplicity of matters of concern. The aim of inquiry therefore becomes the anticipation of the effects of pursuing a particular notion of truth on those epistemologies that entertain a different conception of the idea (c.f. Saitta 1983).

What is the role of our knowledge practices against the setting of possible futures? In *Modes of Thought*, Whitehead (1956, 233) writes that the task of a university is “the creation of the future, so far as rational thought, and civilized modes of appreciation, can affect the issue” (c.f. Stengers 2018, 109). Whitehead then asks what is the role of philosophy in this setting. Whitehead approaches the question through what he terms ‘the fallacy of the perfect dictionary’. The fallacy in the fallacy of the perfect dictionary is the idea that the humankind has already entertained all the ideas that are applicable to its experience and, furthermore, that human language explicitly expresses those ideas (Whitehead 1956, 235). Whitehead then points out that the fallacy is what divides philosophy into two schools, the critical school and the speculative school. The member of the critical school confines himself to the limits of the dictionary, while the member of the speculative school aims to enlarge the dictionary. This enlargement is achieved through appeal to direct insight and to the indication of situations which promote that specific insight (Whitehead 1956, 236). In other words, whereas the critical school adopts a position that is aimed towards the advancement of conceptual clearness, the speculative school sees as its task the creation of concepts that can be added to the dictionary. “The divergence between the schools”, Whitehead (1956, 236) contends, “is the quarrel between safety and adventure”.

We can now look at the epistemic practices of archaeology through the notion of the fallacy of the perfect dictionary. The common epistemic strategies that I outlined in Part Three, and which were also discussed to varying degree in all of the research articles (but most importantly in Articles 1, 4, and 5) are all targeted towards the promotion of epistemic safety. This safety is partly provided by the scholars’ possibility to revert to the dictionary in moments of uncertainty. We learned in Part One and Part Three that for culture-historical archaeology the idealist view of an unchanging cultural ethos on the one hand and the idea of biological evolution by which the culture evolves on the other formed the superstructure that is equivalent to the perfect dictionary. Early New Archaeology on the other hand took positivism’s

literalism and the hypothetico-deductive model as equivalent to the dictionary, while later formulations of New Archaeology came to emphasise natural and cultural processes and the human as part of an ecological law-like system of signification (Article 4; Part Three). Some forms of interpretive archaeology, as we have learned, saw human cognition or human perception as the system of signification and the root for definitions in the dictionary (Article 2).

Because the dictionary includes all of those ideas that are applicable to human understanding, it will provide the scholar with a blueprint for understanding the human mind, and because it encompasses the whole of human understanding, the dictionary will also provide a schematic blueprint for the best possible method of rendering the possible intelligible (Part Three). While the critical position is a safe position, its reliance on the dictionary will necessarily lead to a situation where possibility is conceptualised only within the confines of the dictionary. By these tactics, the physical reality outside of the dictionary is made in the image of what is considered expressible within the confines of the dictionary. These are all tactics targeted towards the elimination of doubt, and the resulting view of the possible is a sterile view with no room for thinking otherwise.

It is worth noting that, for Whitehead, in contrast to the critical school, the speculative school represents a civilised mode of thinking. This is the school that, by rational thought and civilised modes of appreciation, aims to expand the dictionary. For the speculative school, this expansion is only achieved through the intensification of speculation to its maximal point; a method by which the deeply plural nature of experience is exposed (see Part Two). We are therefore not interested in the relationship between the dictionary and the world, but in broadening the dictionary by generating ideas that attract novel experiences (c.f. Stengers 2011b; Debaise 2017a). One of the downsides of the critical school's adherence to the dictionary is that in it the perfect dictionary is considered as a coherent epistemic system that is congruent with—and in some cases the prerequisite of—the real. Naturally, this position states that there are other systems of knowledge that agree with the reality to lesser degrees, and that those systems of knowledge are also in conflict with the perfect dictionary. By contrast, for the speculative school, the task of epistemology becomes the consideration of the real effects that acting on an idea could possibly have in the world, rather than the evaluation and titration of a description against an external permanence. In other words, what the speculative school calls for is betterment of the universe by recourse to the creation of ideas.

In order to elaborate on this ethico-aesthetic dimension of epistemology, I want to return to the idea discussed in Part Two according to which our epistemic practices are always partly creative in respect to the reality they are supposed to represent or render intelligible. John Law and Marianne Elisabeth Lien (2012) have made an interesting case for how the farming-practices of Atlantic salmon in Norway create multiple salmon in the process. Law and Lien then call for an empirical ontology of salmon-farming and argue

that there is no natural or 'real' salmon that exists prior or regardless of the farming-practices. Instead, the two contend that technical or veterinary practices such as measuring or feeding, or scientific practices such as description and taxonomy, each create their own salmon. This process is empirical in the sense that the emergent product of the process of individuation is observably different from the product of another set of relations, and it is ontological in the sense that the resulting salmon cannot be reduced to any particular theoretical construction. On the contrary, because the practices that contribute to the emergence of the salmon are unpredictable, the resulting salmon transcend those practices (Law and Lien 2012, 372). In this sense, a salmon affords many salmon depending on the nature and impact of the practices involved. In other words, each salmon is emergent of the practices involved.

With this notion in mind, we can similarly look at epistemology as a system of practices. What is characteristic of a system of practices is that it is always motivated by particular interests, and in light of interests, the real is not simply a matter of facts, but a matter of concerns (Latour 2004; Witmore 2015). To return to the salmon example, the emerging individual salmon are always result of particular interests, such as economical or scientific interests, but one salmon is not less real than the other.

Isabelle Stengers shares a similar view of the real as a matter of interests rather than facts. Instead of referring to reality as a set of facts, she uses the term 'ecology of practices' (Stengers 2010; 2011a). Stengers discusses her notion mainly in the context of modern science and she contends that the *modus operandi* of modern science has been an invalidation of those practices that do not conform to objectivism's notion of the transcendent. Modern science in this sense has upheld an image of the scientific method as a measure of the real. The resulting epistemology is a linear one that sees the past and the future as symmetrical and connected, and knowable and predictable. Stengers then suggests that, in order to civilise modern science, that is, to make the critical school critical of those concepts that it admits uncritically, modern science should be seen as an ecology of practices. Ecology of practices in this sense is a philosophy that remains responsible in respect to the fact that science is practiced from a variety of perspectives and matters of concern, and that the creation of the real is a matter of assigning importance to the world accordingly (c.f. Witmore and Shanks 2013). The way we have framed modern science here is mainly result of one practice having gained monopoly over the real, partly as result of convincing rhetoric and the promise of settlement of opinion. Stengers then suggests that what civilised scientists have "to cultivate is the capacity to participate in the collective assessment of the consequences of an innovation, rather than a decision based on values" (Stengers 2018, 103). As an ecology of practices, civilised science remains open-ended in respect to the effects of pursuing a thought, because the practices and concerns of one epistemology can produce effects that can hinder or negate those of another. Stengers' suggestion to civilise modern scientific practices (Stengers 2018), however, is not a call for abandoning science nor is it a demand for thinking

unsystematically, but rather about replacing the modern practices' demand for universality and reduction with the systematic practice of considering possibility as more than subordinate to plausibility or probability, or as Witmore and Shanks (2013, 386) describe the situation in the context of archaeology "a common image of archaeology was never behind us. On the contrary, a common image of archaeology has yet to be formulated." This formulation of the identity of archaeology calls for an understanding of unity as a function of diversity rather than universality (Witmore and Shanks 2013, 387).⁵²

Speculative philosophy, then, becomes a "struggle against probabilities" (Stengers 2010, 17), and most importantly this struggle denotes a systematic way of thinking otherwise. Following this notion, Sandra Rosenthal offers an informative description of systematic open-endedness in her *Speculative Pragmatism* (Rosenthal 1986). Like Stengers, Rosenthal does not denounce philosophy as a systematic way of thinking, but instead emphasises that we should be able to keep the adopted system open-ended to the possibility that other philosophical systems may differ in their conception as to the nature of truth and evidence:

To understand speculative pragmatism as philosophical system from within its own perspective is to view it not just as one more system in a tradition of systems in conflict, but rather as a system that recognizes that to understand itself, it must view itself as an emergent perspective that is an outgrowth of that tradition, and which in turn accounts for, or makes meaningful, that tradition through a reinterpretation of it as a past that yields, and is explained by, this novel emergent perspective. Thus, it must offer not just a system based on the evidence it sees, but it must account for the fact that different philosophies differ as to what constitutes the nature of evidence. It must offer not just a theory of truth, but it must account for the fact that different philosophies differ as to what constitutes the nature of truth. It must offer not just foundations, but it must account for the fact that different philosophies differ concerning the very foundations of philosophy. It must be not just another system in conflict, but it must account for the fact that there can be systems in conflict. (Rosenthal 1986, 197)

Following Rosenthal's argument, epistemology, as a way of thinking systematically, should be designed towards the systematic consideration of the multiplicity of matters of concern and points of view involved. In this setting, speculation into the many possible subjectivities involved in research not only becomes the central intellectual operation that aims at the preservation of the *possibility* of difference, but also an opportunity for increased objectivity (c.f.

⁵² Note how here, in contrast to the concept's use in archaeology, civilising does not mean urbanisation or sedentism. On the contrary, civilising denotes a nomadic lifestyle with no real centres of knowledge or fixed points of departure for a hierarchical or stratified evaluation of a system of values. And even if this nomadic philosophical civilising involves the assessment of innovations, it does not base that evaluation on a system of values, but instead is a pragmatic and situated evaluation of the actual and possible effects of an innovation.

Nagel 1986; Haraway 1988; Bauer 2002; Stengers 2010; Savransky 2012; 2014; 2016; Witmore and Shanks 2013; Viveiros de Castro 2014; Åsberg et al. 2015; Sørensen 2017).

Keeping this in mind, the purpose of speculation is to remind us of the fact that there are situations, interests, and knowledges in conflict. Let us consider the implications of this notion in the context of archaeology more practically. As we have learned, the most commonly noted systems in conflict in archaeology have been the humanities and the sciences. Because these two systems are constantly viewed as conflicting in their epistemologies (and ontologies), the possibility of reconciliation has been discussed in terms of interdisciplinarity rather than unification. After the atomisation of archaeological theorising in the course of interpretative archaeology, discussions about the possibility and nature of interdisciplinarity in archaeology have mainly been motivated by the rapid development of genetics (Pluciennik 2006; Lidén and Eriksson 2013; Kristiansen 2014; Heyd 2017; Ion 2017; Sørensen 2017 and comments; Nilsson Stutz 2018). Kristian Kristiansen (2011; 2014) sees the recent methodological development to denote a scientific revolution in archaeology. More precisely, for Kristiansen (2014), the emergence of aDNA studies during the recent decade marks a third scientific revolution in archaeology, the previous two being the adoption of Darwinism in the 19th century, and the emergence of radio carbon dating in the 20th century. In Kristiansen's (2014) view the recent scientific revolution is constituted by the use of big data and quantitative modelling, but most importantly by the development of stable isotope and aDNA research during the recent 10–15 years.

Although increasing reliance on genetics promises a new and heightened sense of interdisciplinarity in archaeology, it also introduces certain problems. Common critique towards the utilisation of genetics in archaeology usually targets the tendency to derive overarching generalisations from a very small collection of samples. As result, the histories of large population groups are being inferred from a limited number of samples (Cassel 2000; Hakenbeck 2008, 16; Johannsen et al. 2017). More importantly, however, as the identity of a population is reduced to a set of genetic markers, the intricacies of the archaeological context and their relevance for questions of cultural variety and individual identity have tended to be overlooked (Heyd 2017; Furholt 2018). Wide-reaching generalisations on population history and migration are often made by geneticists and the shortcomings of the research usually regard poor integration of archaeological materials. The extreme specialisation characteristic of archaeological sciences can often hinder the incorporation of distinct disciplinary traditions and different types of evidence: information from genetics into archaeology and vice versa often travels as simplified facts. At times, this has resulted in research that overlooks important parts of the archaeological evidence, but which nevertheless enjoys a high degree of scientific impact. Furthermore, when combined with ideas of origin and authenticity, aDNA research directly connects with centuries of research tradition in European archaeology (Cassel 2000; Niklasson 2014, 60; Klejn

2017). Obvious risks in this development include the validation of various political or ideological objectives, an old mistake that should be left of the history of archaeology rather than repeated by state-of-the-art research (Müller 2013; Heyd 2017; Hakenbeck 2019). Therefore, the critique usually comes from concerned archaeologists, rather than geneticists. The real challenge in this development has been to incorporate or connect the practices of aDNA research with more wide-ranging knowledge or research on archaeological materials (Lidén & Eriksson 2013; Heyd 2017; Johannsen et al. 2017). The integration of genetic and archaeological data poses challenges especially when dealing with questions of very broad scale where migrations over broad areas or population admixture over long timespans are inferred from a small collection of samples. In general, then, aDNA research is only feasible as part of archaeology.

So, what does this new development do to archaeology? Interestingly, Kristiansen and his team of scientists declare that the new scientific methodology finally lifts the “interpretative burden from archaeology”, and that the new freedom can be invested in “properly theorising and interpreting” local processes of migration (Kristiansen et al. 2017, 335). Kristiansen and his associates leave the meaning of proper theorising and proper interpretation rather vague, but the rhetoric raises suspicions of the possibility of a return to methodological monism à la positivism. For example, the results of aDNA analyses are often understood as verification or falsification of older archaeological interpretations or hypotheses, while what they actually do is raise further questions (Sørensen 2016; 2017). An important question then becomes how to avoid adopting an epistemology that assumes the superior explanatory power of some methods while rendering others unreliable—unless, of course, corroborated by the results of the superior one (González-Ruibal 2014; Sørensen 2017)? By this token, a similarly pressing question is, what does the new positivism do to research that falls outside of the narrow definition of the scientific? Convincingly, Alfredo González-Ruibal asks,

will I be allowed to do my archaeology under the new revolutionary regime? This is not a mere rhetorical question. By ‘allowed’ I mean: will there be funding for projects that do not fit the model proposed [by Kristiansen (2014)]? Will there be positions opened in universities and research institutions? Postgraduate and postdoctoral fellowships for those who take a different path? Furthermore, what happens with those of us who fail to attract the large (and scarce) amount of funding needed for systematic DNA analyses or isotope databases? Are we condemned to do second-rate archaeology? Or even worse, what happens with those thousands of archaeologists who do not even have the chance to apply for funding in places like Africa, the Middle East, or Latin America? (González-Ruibal 2014, 44)

While the new scientific revolution presents itself as a possibility for an increased mode of interdisciplinarity to those already firmly established in the practices of genetics (and other natural scientific methods for that matter),

many have challenged genetics as the hard and fast solution to the problem of interdisciplinarity and asked how can we make sure that those research methods or interpretations that do not have value in the new order can be saved. In attempting to bridge the gap between sciences and humanities, Alexandra Ion (2017) argues that, contrary to having provided a means to proper theorising or proper interpretation, genetics necessitates a rethinking of the connecting medium between the sciences and the humanities. Ion proposes that historical narrative could be the connecting medium between the results of archaeology and genetics. Historical narrative, in Ion's view, would provide the framework in which the results of genetics are rendered archaeologically meaningful. Ion therefore sees archaeology as a form of storytelling in which the role of genetics is to provide parts of the story rather than concluding evidence (c.f. Currie and Sterelny 2017).

In a somewhat similar vein, Sørensen (2017) has argued that the increasing reliance on natural scientific methods as the provider of indisputable evidence tends to render the methods of the humanities unreliable, ultimately leading to the loss of subjectivity and empathy as parts of doing science (see also Article 3). In this sense, the increasing reliance on natural scientific methods directly contributes to the discipline's methodological simplification (Sørensen 2016). Sørensen (2017, 10) then sees speculation as a connecting point between natural sciences and humanities, and he proposes that speculation is the way to provide the two sub-disciplines with a context in which the seemingly disparate realms of evidence can be made to make sense. Sørensen argues that rather than providing decisive conclusions, the results of archaeological science are food for speculations, and that just like the nature of inquiry in the humanities is open-ended, we should also see the results of the sciences as similarly underdetermined: "any answer we arrive at only unleashes a host of new questions" (Sørensen 2017, 10). The insight embedded in this notion is that archaeological science too contains an element of speculation that resists the eliminationist strategies commonly adopted in the epistemology of archaeology (Part Three).

Recently, Liv Nilsson Stutz (2018) has voiced a concern for the future of interdisciplinarity in archaeology. Nilsson Stutz (2018, 52) argues that the recent development that has been presented in the form of a scientific revolution risks a biased neoliberal conceptualisation of interdisciplinarity where the interdisciplinary consists of hypothesis-driven science, or a set of (natural) scientific practices carried out by highly competent researchers who provide clearly ordered scientific knowledge. Nilsson Stutz (2018, 52) then proposes that in order to avoid a situation where perspectives that unnecessarily complicate the past are being suppressed, archaeology should more systematically include perspectives from the sciences and the humanities. For Nilsson Stutz (2018), this is especially important when questions of public and collaborative archaeology and multivocality are considered (c.f. Nicholas and Markey 2015). She then writes that if we approach multivocality not as a political struggle but as "transdisciplinary

collaboration”, we can free our political leanings from the factors that influence our disciplinary identities and strategies (Nilsson Stutz 2018, 53).

Nilsson Stutz contends that archaeology’s relevance in transdisciplinary collaboration is that it provides a way of knowing the world. Importantly, Nilsson Stutz’s world is not the object-world of positivism, but rather a plural concept:

If we accept the premise that there are different worlds, different ways of knowing, then we must respectfully bring what we can offer to transdisciplinary engagement with communities outside the academy. If we want to continue on the path of a decolonisation of the discipline we must focus our efforts on adjusting our attitude, not our insights and knowledge. We need to think in terms of relations—as in power and respect—rather than in terms of essence of determining ‘a more correct way of knowing’. Just as I have advocated for greater disciplinary literacy, I can see greater mutual cultural understanding as an important aim—and a likely outcome—of respectful, sustained engagement with diverse communities seeking and contributing to decolonization. (Nilsson Stutz 2018, 54)

Nilsson Stutz is not explicitly calling for a speculative archaeology, but her statement that—in order to decolonise archaeology (that is, to make archaeology collaborative)—archaeologists have to adjust their attitudes rather than knowledges is an implicit call for a speculative (i.e. civilised) archaeology. This is to say that collaboration can only be achieved by the consideration of the effects of research rather than the veracity of a proposition.

Now, if we again consider the role of speculation beyond hypothesis testing, it becomes clear that the role of speculation in archaeology is to intensify the importance of alternative ways of appreciating the world. Importantly, in order to entertain alternative ways of appreciating the world, speculation denotes a sense of hesitation. This hesitation is targeted at the consideration of the effects of pursuing a particular conceptualisation of the world. In practical terms, hesitation means that we aim to systematically anticipate the possible practical effects that our pursuing a particular truth would have in the world, and by the same token to entail the forestalling of a decision. In other words, hesitation denotes the idea that we consider the effects of pursuing a particular notion of truth on those practices that may entertain a different notion of truth. Anticipation and hesitation, then, are connected modes of appreciation, both of which refer to a future that becomes observable and real in the ecology of practices. So while there is a connecting medium or a common ground that makes it possible to compare not only two or more hypotheses but also the possible effects of pursuing a truth on those whose interests differ from ours, this common ground is not of the nature of an external permanence. On the contrary, the connecting medium makes itself visible as a form of anticipation of action; a perpetually self-renewing possibility for felt experience (c.f. Dawney et al. 2017). Specifically, in the context of archaeology,

in the sense discussed above, the hesitation necessitated by the presence of possibility would denote a sense of responsibility for the ways in which upholding or presenting a particular research program or a set of methods as superior or more reliable than others would have on the world (Part Two; c.f. Saitta 1983; Witmore and Shanks 2013; Cipolla 2018). Most importantly, then, in the methodological sense, the hesitation called for here is aimed at the intensification of the fact that methodological simplification will also lead to ontological simplification. My question then is, what happens to ontological plurality in the age of fast science?⁵³

15. Slow science for fast archaeology

The history of archaeology's scientific revolutions is also a history of acceleration. As a modern science, archaeology is marked by 19th century ideals of progress and accumulation of knowledge. On the one hand, the idea of cumulative knowledge is rather evident in the sense that, to a great extent, archaeology can be characterised as total history that sees the past as a collection of parts that can ultimately be pieced together by careful collecting (Article 4; Part Three). On the other hand, as already noted, in a more explicitly methodological sense, the history of archaeology can be seen as a series of conceptual and technological advances from the wide-ranging implementation of evolution theory in the course of the 19th century to the invention of radiocarbon dating in the mid-20th century, and more recently to the increasing interest in matters of provenience and mobility and the use of digital technologies, genetics, and big data towards those ends.

In science in general, the rapid methodological development in the course of the 20th century has sparked a distinct countermovement that goes by the name of 'slow science'. According to Jerimy Cunningham and Scott MacEachern (2016), slow science is marked by

- (1) a recognition of the ethical and human consequences of scientific research and of the human relations involved in such research; (2) a recognition of the need for contemplation, collaborative learning and careful thought in the course of research; (3) some concern for the communal aspects of such research, for mutual cooperation and support by colleagues and students; and (4) a critique of

⁵³ This type of simplification is not only a concern in the sciences. As Latour (2004, 233–234) has noted, philosophy, perhaps more so than the sciences, has fallen victim of simplification through their selection of empirical examples: "The problem with philosophers is that because their jobs are so hard they drink a lot of coffee and thus use in their arguments an inordinate quantity of pots, mugs, and jugs—to which, sometimes, they might add the occasional rock. But, as Ludwik Fleck remarked long ago, their objects are never complicated enough; more precisely, they are never simultaneously made through a complex history and new, real, and interesting participants in the universe. Philosophy never deals with the sort of beings we in science studies have dealt with. And that's why the debates between realism and relativism never go anywhere." To this one might add that, in comparison to archaeology, the empirical examples of STS are never complicated enough. In other words, an archaeology that accounts for not only the mugs and cups and the occasional rocks but also the complex histories of new and real participants in the universe, could bridge the gap between realism and relativism.

bureaucratization and the inappropriate intrusion of practices and concepts from business and management into the academy, whether in research and/or in teaching. (Cunningham and MacEachern 2016, 633)

Unsurprisingly, the slow science movement has found supporters in archaeology as well. One commonly shared concern within the slow archaeology movement is that digitalisation and other so-called fast methods can have an alienating effect (Article 3). For many, then, slowing down denotes a way of regaining an appreciation for the humanity and the craft of archaeology (Caraher 2013, 2016; Cunningham and MacEachern 2016). William Caraher (2013), for instance, has voiced a concern for the preservation of the craft of archaeology (c.f. Caraher 2016; Cunningham and MacEachern 2016). Caraher (2013) contends that the digitalisation of archaeology has resulted in the fragmentation of research practices and a weakened state of mutual understanding of the research process among involved parties. More importantly, however, Caraher contends that digitalisation has resulted in the fragmentation of knowledge about the very object of research. Slow technologies, then, that is technologies that are 'inefficient' in contrast to fast technologies, for Caraher, would mark a state of heightened appreciation of those phenomena that routinely go unnoticed in the digital era. One specific way to reintroduce a sense of craft in archaeology would be the use of handwritten notes in field documentation. This, Caraher argues, would provide a stronger link between our bodies and our understanding of the past, as well as between our bodies and those of past individuals. Moreover, Caraher (2013) argues that slowing down would help individuals to recognise their role in the process of interpretation and help make the discipline more humane, more open, and most importantly more inclusive and ethically sustainable (c.f. Wylie 1997; Saitta 2007; Fossheim 2017; Tringham 2018; Milek 2018; Domanska 2018; Caraher 2019).

Cunningham and MacEachern (2016), on the other hand, provide an ethnographic perspective to slow archaeology. For Cunningham and MacEachern, ethnography should be understood as a way of resisting the simplifying effect of the natural scientific revolution. They argue that ethnoarchaeology could be a form of slow archaeology if ethnoarchaeology is not understood as limited to the construction of middle-range theories or modern analogies, but instead as a way of developing an understanding of modern cultural variety. This realisation, then, could be used in archaeological contexts as a way of intensifying the sense of cultural variety in the past (Cunningham and MacEachern 2016, 635; c.f. Zubrow 1989).

As a gesture of inclusion, slow science, then, aims to decelerate methodological development for the sake of preservation of the multiplicity of matters of concern, and methodological deceleration, in turn, would lead to more efficient communication within and between different disciplines, ontologies and epistemologies.

The sense in which I want to call for a deceleration of science is not an attack on technology, scientific methodology, or interdisciplinarity, but rather

a call for the type of civilised science outlined by Whitehead and Stengers (see discussion above). Most importantly, Stengers (2018) characterises civilised science as an acknowledgement of the communal and social aspects of science. Civilised science, for Stengers, then, entails the appreciation of the various matters of concern involved in research. In this sense, civilising is not the modernist act of universalisation, or the act of civilising those who remain unaware of the modern method of scientific evaluation, both in terms of competing hypotheses and the results of science (see also Cunningham and MacEachern 2016). On the contrary, what civilising means for Stengers is not an act of education but a process of healing. This healing is driven by the idea that things could be differently, or what Stengers (2018, 145) refers to as “the possibility of creating relevant modes of togetherness between practices, both scientific and non-scientific; finding relevant ways of thinking together” (c.f. Nilsson Stutz 2018).

In order to elaborate on what this togetherness might mean in the long term, I want to return to Peirce’s considerations about the aim of inquiry. In epistemological terms, civilising denotes a consideration of what Peirce referred to as “the most admirable end” of scientific conduct. If inquiry is driven by epistemological considerations of logic, and by the centrality of abductive logic in particular, the most admirable end also denotes a deep sense of ethical consideration of what and to whom the end as an outcome of the use of logic means. Interestingly, however, Peirce contends that, in determining the most admirable end, epistemology has to turn to not only ethics but ultimately to aesthetics for guidance:

Esthetic is the science of ideals, or of that which is objectively admirable without any ulterior reason. Ethics, or the science of right and wrong, must appeal to Esthetics for aid in determining the *summum bonum*. It is the theory of self-controlled, or deliberate, conduct. Logic is the theory of self-controlled, or deliberate, thought; and as such, must appeal to ethics for its principles. (CP 1.191, my emphasis)

Peirce placed logic, ethics, and aesthetics under ‘normative science’, or the science that “investigates the universal and necessary laws of the relation of phenomena to *Ends*; that is, perhaps, to Truth [cf. logic], Right [cf. ethics], and Beauty [cf. aesthetics]” (CP 5.121, emphasis original). The end, Peirce contends, is not instrumental to an end, but would have to be desirable in itself. The determination of the most admirable end, then, renders logic a matter of ethics and, in determining the most ethical or admirable end (for no other reason than the end itself), ethics has to resort to aesthetics for guidance (Smith 1972; Apel 1981; Liebhaufsky 1986; Barnouw 1988; Tejera 1994; Herdy 2014).

What facilitates this train of thought is the very concept of the *summum bonum* (Herdy 2014, 276). In other words, the end would have to be equally true, right, and beautiful. Sørensen et al. (2011) clarify this position in the following way:

The aesthetic finality makes up the most basic condition for the rational and creative nature of man; thought as a kind of self-controlled action can only be intentional if reason as an aesthetic ideal has been transformed into a habit of feeling [...]. The aesthetic finality provides in other words a telos that points at self-controlled action, and creates the possibility for the goodness of action, the truth of reasoning, and the attraction of feeling. It makes up the basis for reasoning, allowing the feelings, actions, and thoughts of man to move in a certain kind of direction, in harmony with the development of the universe, towards a greater rationality. According to Peirce, this is the manifestation of the progressive state of reason, or the growth in the concrete reasonableness, which he used synonymously with *summum bonum*, the highest good. In other words, evolution is an aesthetical-moral process, rather than a process that moves in any direction what so ever. Man is marked by the living telos of reason. He is attracted to it by aid of the intrinsic aesthetic goodness of the idea(s), so that there can emerge an intellectual sympathy in his mind. Only in that way, he can truly become creative. (Sørensen et al. 2011, 226, emphasis original)

Importantly, then, in this context, aesthetics is not the “pleasure-ground of those who spend their lives in the delights of art” (MS [R] 602.11). Rather, aesthetics denotes a principle or a method for resisting the “habitual modes of perception” (Thomas 2017, 201), a kind of preservation of ignorance for the purpose of greater equality (Rancière 2006).⁵⁴ The above discussed reality of the possible as an ontological register, in this context, is an important consideration. The possible is not determined by the existing world but by an ideal world, a world that “ought to be” (Herdy 2014, 269). Rancière (2006, 5) poetically refers to this possible state of knowing as a “finality without end”. Ultimately, however, the *summum bonum* is motivated by the melioristic idea that even if, or perhaps because, humans are fallible, they have the capacity, desire, and moral duty to alter their habits for an improved future situated somewhere between conservative pessimism and progressive optimism (Bergman 2012; 2015). In other words, meliorism occupies the middle ground between anti-intellectual Ludditism and scientific hubris.⁵⁵

By this notion, we can return directly to the considerations of the role of aesthetics in speculative philosophy discussed in Part Two. Aesthetics as first philosophy becomes the antidote to the habits of thinking in causal terms and the related deterministic notion of symmetry between the past and the present. In other words, aesthetics highlights that the future is not a straightforward extension of the past. Most importantly, aesthetics in the speculative sense marks a willingness to detect degrees of difference that the

⁵⁴ It is worth noticing that abduction expresses a similar positive ignorance-preserving quality because it entails a speculative orientation towards the unknown (c.f. Magnani 2009; 2013).

⁵⁵ See, also, Wilson and Brunson (2017) who take *summum bonum* to denote a ‘transhumanist’ mandate for the augmentation or betterment of human cognitive powers in order to transcend the limits postulated by deterministic and causalist thinking. By this token, it should also be noted that I refer to fallibilism not as the idea that knowledge remains incomplete in terms of resembling a reality but as the idea that in order to anticipate the possible effects of knowledge claims to a community of inquirers they have to be operationalised through a fallibilist framework.

destructive habits of thinking towards the settlement of opinion might end up suppressing (Article 5). In this sense speculation directly aims at the recognition of different modes of aesthetic appreciation, or the different modes of assigning importance to the world, and the idea that these are modes of creativity rather than determination (c.f. Thomas 2017). This is why Sørensen et al. (2018) likewise refer to aesthetics as attraction of feeling.⁵⁶

Through their separation between practice and result, modern practices aim at the suppression of the multiplicity of feeling and modes of aesthetic appreciation (Article 3; Stengers 2010, 30). One can identify something as simple as the structure of the scientific article as one such strategy of separation. The research article has become the major forum for publishing the results of scientific research, but its form—which often begins with the presentation of the materials and methods and proceeds to the reporting of the results and a discussion of their importance—tends to give a somewhat distorted or simplified picture of research. For this reason, Peter Medawar (1991) has called the scientific paper a fraud. Medawar argues that the form of the scientific paper misrepresents the thought processes that gave rise to the results reported in the paper. Medawar’s discontent with the scientific paper is based on the idea that science as discovery or creation of new ideas is, contrary to how the scientific paper represents it, not inductive in its fundamental nature (Articles 4 and 5, Part Three; c.f. Hanson 1958). For Medawar (1991), induction implies that we always start with an untarnished mind and naively collect observations or bits of data and only then come up with new knowledge, whereas in reality the idea often precedes the identification and collection of the evidence. Medawar then points out that rather than relying on a schema of demonstration, discovery starts with a sense of importance or relevance; that a particular hypothesis should be investigated further (as in Peirce’s post-1903 understanding of abduction; Ma and Pietarinen 2018; Chiffi and Pietarinen 2019). For this reason, Medawar suggests that the inductive form of the scientific paper should be discarded. To begin with, Medawar contends that the discussion, which is usually placed at the end of the paper, should come first. This means that the hypotheses that the paper misrepresents as conclusions should be presented at the beginning as hunches or ideas, followed by ‘the scientific facts and scientific acts’, that is, the presentation of materials and methods. In other words, Medawar argues that scientist should not be ashamed to admit that “hypotheses appear in their minds along uncharted byways of thought; that they are imaginative and inspirational in character; that they are indeed adventures of the mind” (Medawar 1991, 233).

Medawar’s criticism only pertains to one type of scientific paper and he is exaggerating the problem’s extent to a certain degree. His worries nevertheless highlight the fact that only those hypotheses that are deemed successful by the researcher, or his peers for that matter, make it into the publication. By

⁵⁶ There is definitely a connection between Peirce’s aesthetics as consisting of aesthetic finality, and the sense in which Whitehead considers lure for feeling as the aesthetic quality of experience (c.f. Barnouw 1988; Thomas 2017)

omitting factors like guesswork, failure, or personal audacity, scientific writing often misrepresents the processes that created the conditions of demonstration to begin with (Snyder 2005; Lahiri 2017). Importantly, then, it is unusual to report in articles the hunches and intuitions that led to discovery, not to mention the anxieties caused by entertaining hypotheses that turned out to be false.⁵⁷ The writing style of science tends to conceal the ambiguities or personal aspects involved in research by overvaluing non-ambiguous language (Gero 2007, 2015; Boozer 2015; c.f. Hodder 1989; Chippindale 1996; Lucas 2019; Articles 3 and 5). Research tends to be reported in concise and impersonal language and as the outcome of the utilisation of clearly defined evidential categories which allows for the identification of significant observations or research results, a procedure Joan Gero refers to as “cleaning the data” (Gero 2007, 320). More importantly, this cleaning of data tends to ‘black box’ certain methodological aspects as well as social and intellectual processes that led to the discovery of those results in the first place, at least until something goes wrong (Latour 1987; c.f. Law 2004; Harman 2009). In this sense, scientific reporting is a type of liturgy designed towards the preservation of a tradition rather than the reporting of the factors that led to the creation of an idea.

In addition to these considerations on the distorting effect of scientific publishing, one should keep in mind that as more and more emphasis in archaeology is put on publishing in high profile scientific journals, and because publications in these journals weigh more than publications in those of the humanities in the evaluation of research output, the tendency will ultimately result in lesser degrees of impact or relevance for those who publish in the humanities (Lidén 2017). Lidén and Eriksson (2013) contend that the above discussed tendencies have resulted in the widening of the gap between the sciences and the humanities. As a solution to the problem, Lidén and Eriksson (2013) propose that what is needed for better collaboration between the two fields is a common language, and that the development of that language hinges on the realisation that the two fields are connected by common research problems (c.f. Lidén 2017; Tringham 2018). From the ecology of practices viewpoint, however, the common problem approach appears as a similarly simplifying strategy based on the assumption that all of the research questions of science are connected through a value-neutral common ground. Recently, Alfredo González-Ruibal (2018) has noted that not even the Anthropocene, regardless of the global, ubiquitous, and destructive nature of the matter, can be considered a common problem. While the scale and magnitude of the problem transcend its historical causes, and although the problem has a deep and common anthropogenic aetiology, the Anthropocene nevertheless affects people who cannot be held accountable for creating it. Following the ontological principles addressed above, namely that the practices of science contribute to the creation of the world, methodological and conceptual

⁵⁷ In this context, it might also be useful to consider the epistemic and heuristic value of reflection on missed opportunities for developing a readiness to seize future opportunities more intuitively and open-mindedly (Myers 2011).

simplification (which the postulation of a common problem undoubtedly leads to) can ultimately result in ontological simplification. The task of speculation, in this setting, is to resist the tendency that the practices of conclusion and proof—and the postulation of a common problem in the first place—have towards the eventual eradication of possibility and difference. Against this background, slowing down would denote a hope of developing ways to appreciate and conserve rather than eliminate or black box the vague and messy aspects of research (Articles 3 and 5; Gero 2007; Caraher 2016; Sørensen 2018; Stengers 2018, 120).

Practical measures for a speculative epistemology of archaeology through deceleration

In the social sciences, the recent decade has seen an incredible increase in interest in conceptualising speculation and uncertainty as relevant for imagining the variety of the possible and the unpredictability of the future as forces of creation and as loci for understanding differently rather than as points of elimination. This has generated a large body of literature towards inventing speculative methods in social sciences, anthropology, sociology, ethnography, art, and design (e.g. Dunne and Raby 2013; Smith et al. 2016; Salazar et al. 2017; Wilkie et al. 2017; Wilkie 2018; Pink et al. 2018; c.f. Moffat 2019). In archaeology, however, as we saw in Part Three, attempts to conceptualise the methodological relevance of speculation beyond proposition and as a matter of the future rather than the past have been sporadic and, as we saw in Chapters One and Two, theoretical rather than practical. Obvious reasons for the lack of engaging in thinking the future include the concrete nature of the subject matter of archaeology as well as its strong and increasing reliance on the methods of the natural sciences. More important, however, is the fact that archaeology—and heritage studies for that matter—have, for obvious reasons, been conceptualised as disciplines of the past rather than the future, or that the future has been seen as an extension or a development of the past (c.f. Högberg et al. 2017; Ståhl et al. 2017; Reilly 2019). Thinking of the future as relevant for future concerns rather than as relevant for present needs is particularly challenging in light of archaeology's conservationist objectives.

What practical possibilities do we have then to render speculation an epistemologically relevant concept beyond conjecture about the past and, more importantly, as a notion relevant for the future of archaeology itself? I propose two interrelated avenues. The first one is the deceleration of our scientific practices in order to reveal those intellectual, technological, or social processes that become concealed through those practices that aim at the systematic and constant evaluation of results, such as the above-discussed scientific paper. What this could mean in the case of the scientific paper, for instance, is the systematic reporting of the initial hunches, failed ideas, and intellectual dead ends that were entertained in the course of the research

process but which nevertheless remain unreported to our fellow researchers, at least in writing. Whereas the scientific article can be provided with supplementary material and detailed descriptions of the data or the materials studied, why not provide in the supplementary material an inventory of the aforementioned intellectual dead ends or those unsuccessful hypotheses that did not make it into the results chapter of the article (c.f. Good 1970)? Ultimately, the reporting of possibilities in connection with verified results could lead to a readiness to think of speculation as valuable for the future rather than as a threat to scientific credibility. That a hypothesis failed in inducing a belief in the present does not mean that the idea could not be further developed by others in the future (Good 1962).

The reporting of disciplinary anxieties caused by uncertainty does not have to end at the scientific article. The same tactics could be adopted when arranging scientific meetings where the scientific presentation is too often structured with the intent of driving a point home, in as little as seven minutes (including discussion), and in “bullets’, no less” (Stengers 2018, 122). As an alternative to fast presenting, Stengers explores the possibility of organising slow meetings:

As for us academics, what about introducing slow meetings, that is, meetings organised in such a way that participation is not only formal? What about slow talks, not just inviting people one really wishes to hear, but reading and discussing beforehand so that the meeting is not reduced to the ritual of attending a prepared lecture that ends with a few banal questions? What about demanding that when colleagues speak or write about issues that are beyond their field of expertise, they present the information, learning and collaborations that have allowed them to do so? What about ensuring, when expertise is needed on an issue of common concern, that co-experts are present and able to represent effectively the many dimensions relevant to the issue? From the point of view of fast scientists, all these proposals have a common defect. They all involve wasting time, or worse, breaking with the symbiotic relation that binds ‘true progress’ to industrial innovation. (Stengers 2018, 124)

The sense in which Stengers’ industrial innovation should be understood is innovation for the sake of novelty, or the type of innovation characteristic of today’s consult economy (c.f. Hamilakis 2004; Cunningham and MacEachern 2016). In this sense, the purpose of organising a slow meeting would be to resist the sophistic rhetoric of this economy and make visible to others—rather than obscure for reasons of convincing them—the personal insecurities involved in research. In this way we could make more visible to the audience that our, just like their, research process does not follow a clearly defined and predetermined protocol or logical schema. This intensification of the ambiguities, insecurities, and uncertainties of research could increase the sense of mutual understanding (Gero 2007). This should strengthen the idea that the progress of science does not hinge on methodological acceleration and innovation, but on the researcher’s ability to think otherwise in as many ways

as possible. This is also the sense in which Anna Tsing (2015, 17–25) calls for an “art of noticing”; a way to look around in order to detect the polyphonous assemblages of the world rather than a particular method of looking ahead in the name of progress. In other words, it is always better to postpone innovation than it is to solve the problem at hand for the sake of closure or general advancement of a unified agenda.

In addition to publications and talks, more importantly, then, we can expand the issue of acceleration to pertain to the whole history of methodological and theoretical innovation in archaeology. As has become evident in the course of this thesis, we tend to conceptualise the discipline as a history of paradigmatic revolutions and intellectual turns, each designed to provide methods or theories that are better, more efficient, or more robust than the previous approach. In this sense acceleration is not only characteristic of the archaeological sciences but pertains the humanities as well. Archaeological theorising in particular is marked by the reinvention or borrowing of theoretical ideas from a multitude of other disciplines or philosophical schools in particular (Bintliff and Pearce 2011; Lucas 2015; Sørensen 2018). Often, however, counterproductive to their objectives, theoretical turns are motivated by innovation for the sake of innovation rather than innovation for the sake of increased understanding (Article 5). In archaeological theorising, structuralist and poststructuralist semiotic theories, for instance, were deemed flawed or lacking in the course of the material turn (Article 2; c.f. Crossland and Bauer 2017; Newell 2018). The same thing happened to positivism with the introduction of poststructuralism, and before that to cultural idealism after the introduction of positivism (Articles 1 and 4). Ironically, with the increasing development in scientific practices, genetics in particular, archaeology is facing a possible return to the essentialism of cultural history, only disguised in a form of a new positivism or a new methodological monism (Article 3). The purpose of slowing down in this context is to reconsider the effects of both methodological and theoretical acceleration and its tendency towards simplification for the sake of novelty.⁵⁸

What archaeological theorising then needs is a sense of hesitation in adopting the latest theoretical trends (Article 5; Ribeiro 2016; Sørensen 2018). How about staying with the positivism or staying with the structuralist theories of signification? Not for the sake of hesitation, but in order to subject these now downright boring intellectual traditions to a process of healing; a reclaiming of that which is too often abandoned as being too messy or too demanding (Stengers 2018, 120). In this sense, we might be able to separate the creative contents and contributions of these old and inefficient theoretical

⁵⁸ See, also, Hamilakis (2004) for a critique of instrumentalism in teaching in higher education. Hamilakis (2004, 296, *emphases original*) contends that, instead of teaching practical skills that have real world relevance in a world where relevance is defined in terms of economic efficiency, “[a]rchaeology’s main teaching aim could be to show that things *could have been otherwise*, that the present conditions are historically contingent and explainable. It can show how certain power relations, inequalities and asymmetries have been *objectified*, have been inscribed into the landscape and on the material world, so as to appear natural and eternal. It can also show how, often, these objectified material relationships have proven vulnerable, unstable, ephemeral.”

fields from their destructive effects. Granted, theoretical acceleration only becomes visible when observed at a distance, but because the image that we get from the distance is also the image we get when observing the narrow elite of archaeology's theoretical development, and because that elite often has the most power in terms of the discipline's historical self-understanding and in terms of 'setting the agenda' (Yoffee and Sherratt 1993), the procedures of slowing down should first and foremost concern the narrow but powerful elite, both scientific and speculative.

The second sense in which I want to propose a deceleration of archaeology is directly connected to the methodological considerations discussed above, but it also connects more intimately with questions of interdisciplinarity and the possibility of developing common understanding. Even more important than arranging slow meetings or reporting the researchers' personal anxieties in scientific publications for these objectives is the development of historical awareness in interdisciplinary research. In this sense, it is not enough to work towards a common language defined by a common problem (cf. Lidén 2017), but instead towards an understanding of the histories of the disciplines involved. Whereas the common language approach is aimed at the identification and eradication of the common problem, the historical awareness approach would aim towards the exposition of the reasons that led to the identification of that problem in the first place; to whom and why is the common problem a mutual concern? In this sense, the historical awareness approach aims to understand that which remains unsaid in collaborative and interdisciplinary situations. This is to say that the practices of any one discipline are historically meaningful and historically relevant and can be better understood with knowledge of the history of that particular discipline. The aims or goals of research to a large extent depend on the nature of previous research, its subject matter, as well as its methods and the results those yield, and in order to better understand the concerns of researchers in neighbouring disciplines we need a better understanding of the histories of those particular disciplines, both in terms of material and ideal intentions (Part Two; Descombes 2001; 2014; Preucel and Mrozowski 2010; Rathje et al. 2013; Herschend 2015; Piironen 2018; Ribeiro 2018b).

For an archaeologist, this would mean that they first develop an understanding of the anxieties or matters of uncertainty that were felt and entertained in the course of the history of the discipline. What was the prevailing consensus or what were the alternative positions to the predominant one at any given instance? Why was a theory or a philosophy abandoned and replaced with another? This was my central aim in Article 4, in which I argued that the relative slowness of Finnish theoretical archaeology should not be seen as an atheoretical positions, but as a deliberate theoretical strategy to avoid those epistemological approaches that might end up simplifying the subject matter. The article then aimed to highlight that a more detailed study of the history of the epistemology of archaeology could be one solution to the problem of conflicting research objectives. In particular, the article shows that those archaeologists which the historiography of Finnish

archaeology has tended to label as naive empiricists are in reality those who are concerned of preserving the multiplicity of interpretations as a research possibility rather than as an epistemological shortcoming. In other words, we tend to think that past scholars adhered to what now seems an outdated research position only because that position was replaced with a better one for reasons obvious to us. In this sense, the history of archaeology truly is emergent of its subsequent development, and the resulting view of the past will most likely be a distorted one. Interestingly, then, I have also noticed that those scholars who have knowledge or insight in the history of archaeology often have a lot to offer in discussions that nevertheless deal with topics not immediately connected to their field of expertise. This is to say that more important than detailed knowledge of particular theoretical trends or schools is the ability to evaluate those theoretical standpoints in the context of the history of the discipline more broadly.

As to the geneticist understanding of the history of their discipline, I am afraid I have little to offer. Nevertheless, although aDNA research is considerably younger than archaeology, I believe that the writing of the history of the discipline is possible, and it has already been attempted (e.g. Der Sarkissian et al. 2015; Hagelberg et al. 2015). However, perhaps due to its short history, the historiography of aDNA research appears as a technical review of the merits, challenges, and potential applications of the method itself rather than as an exposition of the (possibly conflicting) concerns of individual researchers or research groups, not to mention possible solutions to the problem of (possibly) incommensurable research objectives. What this could entail for the relationship between archaeology and genetics first and foremost is a possibility of writing a common history of the disciplines or a history of the interdisciplinarity of archaeology that includes both the concerns of the geneticist and the archaeologists. In this sense, the writing of a common history could present itself as a possibility for slowing down for a deeper mutual historical understanding. Philosopher Martin Savransky's description fittingly clarifies this challenge:

It is a challenge that requires the remaking of existing practices and the invention of new ones in order to transform the milieus that they sustain and induce an *experience of hesitation* that may create the space for the crafting of a problematic togetherness of entities and relations, but also of solitudes, of dreams and hopes. A form of togetherness that can never be stabilized, but which constitutes a risk, and a possibility, for a practical and always partial construction of common worlds. (Savransky 2012, 365, emphasis original)

At the same time, then, one should again bear in mind that gaining a historical understanding is not only a matter of developing understanding or appreciation between disciplines for the sake of efficiency in eradicating the common problem. Ultimately, the development of mutual understanding and appreciation should be driven by the realisation that the community of practitioners is always anticipating the imminent arrival of further participant,

both human and nonhuman, who have concerns or needs that may have been unanticipated or unaddressed by present members of the community and that, in order to include those guests and attend to their needs, the community of inquirers will benefit greatly from a sense of attentiveness from behalf of the host of the party. Worth bearing in mind is also that the possible guests are not limited to the trained researchers, funders, or members of the public who remain outside the negotiations of the sciences but whose lives are always possibly affected by the results of science. There is therefore always that “vague ‘beyond’, waiting for penetration in respect to its detail” (Whitehead 1956, 8). Because penetration into this vague beyond is simultaneously an act of discovery and an act of creation, and because the matters that concern the beyond are not simply dictated by the social or the human, in the commonly adopted sense of the terms, penetration necessitates a certain ethical understanding or consideration of the significance of speculation as a form of open-ended attentiveness towards the effects of our being in the world (Savransky 2016). This speculative sensitivity, it can be argued, can only be achieved through hesitation and deceleration; through the cultivation of a speculative attitude.

16. Slight return to the typology of archaeological inference

In place of a part conclusion, and partly as a response to the research questions presented in the introduction of the thesis, I want to return to the sixfold typology of archaeological inference presented in Part Three and offer a supplementary formulation for a speculative epistemology of archaeology. As we saw in Part Two, in recent archaeological theorising the role of speculation has mainly been discussed as ontologically rather than epistemologically relevant. Whereas the sixfold subgrouping of archaeology’s methodology given in Part Three highlights that the common epistemological strategy in archaeology has been the gradual elimination of speculation in favor of increased intellectual security, this thesis has aimed to find an epistemological relevance for speculation beyond conjecture. In other words, my intention has been to combine the empirically sensitive ontological concerns of speculative philosophy while also retaining a degree of historical understanding of the epistemology of archaeology as a genealogy of possibly conflicting epistemological concerns. In other words, in addition to developing a degree of ontological sensitivity, a speculative epistemology of archaeology would also have to be historically sensitive. Unlike some ontological approaches in archaeological theorising, a speculative epistemology is not iconoclastic of the methodology of archaeology but aims to situate itself in relation to and as responsible of the history of the epistemology of archaeology.

I therefore propose a further addition to the sixfold typology, one that, for lack of better definition, could be called the speculative empiricist position. Insofar as the epistemology underlying this position pertains to the three

principal forms of inference discussed in Part Three, a speculative empiricism is inductive, but only insofar as induction is aimed at the identification of the habits of thinking, that is, at the perpetual anticipation of the *summum bonum*. A speculative empiricism of archaeology also finds relevance for deduction, but only insofar as deduction is not simply aimed at the identification of conflicting explanations, but at the separation between destructive and constructive modes of inquiry. The main thrust of the speculative empiricist position in archaeology, then, is towards the intensification of abductive inference, but only insofar as abduction is not simply aimed towards the creation of an idea for the sake of its eventual cementation through established habits of thinking, but also towards the preservation of thinking otherwise. On the contrary, then, for a speculative empiricist (epistemology) of archaeology, the preservation of the multiplicity of abductive inference becomes a responsibility because thinking otherwise is a function of the creation of the past. This takes us back to the beginning of the cycle, that is, the inductive identification of the habits of thinking.

Importantly, the speculative empiricist's position is not that of the relativist which claims no method of evaluation for prospective knowledge claims. Instead, speculative empiricism is a form of pragmatism that is always caught between the consideration of both sensed effects and those anticipated; a commitment to the possible "by means of resisting the probable" (Debaise and Stengers 2017, 18; c.f. Parisi 2012). The creation of the past then directly contributes to the creation of the scientific atmosphere in the present as well as to the possibilities that the discipline will find for developing responsible methods for continuing to research the past also in the future.

CONCLUSION

Philosophy begins in wonder. And, at the end, when philosophic thought has done its best, the wonder remains. (Whitehead 1956, 232)

In the introduction of this thesis, I asked what significance speculation can have in the epistemology of archaeology beyond its role as the originator of testable hypotheses regarding past realities? In answering this question, I began with an ontological exploration that aimed to demonstrate how a sense of speculation permeates not only scientific knowing but all existence as a form of interpretation. In particular, I argued that interpretation is a form of creation; a pluralised mode of aesthetic translation. Furthermore, I claimed that that which in interpretation is emergent of its antecedent objects or aesthetic relations cannot be reduced to prior or more elementary parts. Instead, objects, archaeological or otherwise, exist as modes of anticipation; never quite finished and therefore never entirely knowable. In other words, I speculated that speculation is an ontological mode of existence as much as it is an epistemological reality.

After having established the ontological principle, namely that a sense of speculation permeates all experience and not just human interpretation, I continued with an empirical exposition of the history of theorising on forms of archaeological knowledge production. I argued that the history of archaeology's epistemology is a history of the elimination of speculation, and I also aimed to show that the elimination of speculation has hinged on a variety of ontological and epistemological constructs, all aimed towards the eventual elimination of false hypotheses and the cementation of true propositions. In other words, I argued that the sense in which the significance of speculation is understood in archaeology today as a point of elimination is a continuation of the history of the discipline, but not the full extent of the epistemological significance of speculation.

In attempting to combine the ontological principle that speculation characterises all interpretative relations with the empirical observation that the history of the epistemology of archaeology has to a large extent been a history of the elimination of speculation, I concluded that, beyond its purpose as the originator of possible explanations of the past, speculation as an epistemological notion should be taken seriously and even cared for. I therefore argued that

the significance of speculation lies in its capacity to intensify the importance of the multiplicity of experience rather than the singularity of past reality. In the epistemology of archaeology, speculation should entail an anticipation of the real and sensed

effects of upholding—and acting upon—a particular view of the aims of research on those epistemologies whose aims are different.

This is particularly important in today's multidisciplinary research environment, and I argued that in order to develop more intimate degrees of multidisciplinary understanding a sense of the importance of speculation is to be combined with a sense of historical understanding of the research interests of those disciplines that contribute to the totality of what we refer to as archaeology. I suggested that this could be achieved by seeing speculation as a form of slowing down. Because speculation also entails thinking of the future as the locus of methodological and theoretical innovation, slowing down—as a kind of failsafe—becomes a way to anticipate and evaluate the possible practical effects of acting on a speculation. What this type of deceleration does not entail is that the elimination of speculative hypotheses should not be considered an important aim of science; it simply means that hypotheses may become eliminated or confirmed for the wrong reasons (see Part Four), and that for that very reason speculation should be preserved as a perpetual anticipation of how things can be otherwise.

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RESEARCH ARTICLES